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HAMMAD A. HUSSAIN

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ARISTOTLE'S 'GENETIC ACCOUNT' AND THE PROBLEM OF
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DEPARTMENT OF PHILOSOPHY

BY

Dr. Hugh Benson, Chair

Dr. Monte Cook

Dr. James Hawthorne

Dr. Chris Swoyer

Dr. Steven Livesey

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Abstract

The problem of induction—the problem of how one can justify an inference from observations of *some* things of a type to a generalization about *all* (or most) things of the type—is one of the most important in logic and epistemology. In addition, one of the enduring problems of Aristotle scholarship is whether he dealt with the problem of induction, and if so, how. This problem is important in connection with *Posterior Analytics* B.19, where Aristotle seems to provide an account, a piece of genetic epistemology, of how the principles of demonstration are acquired. The account seems to describe an inductive process. In my dissertation, I argue that Aristotle does have to face that problem of induction in the genetic account of *APo.* B.19, and has a putative solution to it. I argue that the putative solution to the problem is based on his doctrine of natural kinds.

I argue first that Aristotle in fact recognizes induction that consists of reasoning from particular propositions to a universal proposition. I then evaluate various readings of the genetic account of *APo.* B.19. I argue, in particular, that there is strong textual evidence against the claim that Aristotle thinks that principles of demonstration are secured by *nous* as intuition, so that *nous* is the solution to, or a way to avoid, the problem of induction.

What then is Aristotle's putative solution to the problem of induction? I argue, in essence, that for Aristotle the solution is a matter of retaining enough percepts of particulars in the subject kind of the conclusion (and maybe some outside of that kind) in memory for the universal form of the subject kind to become salient and clear in the rational soul. Thus, having the comprehension (*nous*) that all normal horses are quadrupeds is a matter of retaining enough percepts of horses, each having four legs, for the universal form of horse to "make a stand" (in Aristotle's words) in the mind of the inducer. In this way, the inducer comprehends that the four-legged-ness is part of that form, i.e. that it "belongs to" the form horse, i.e. that all normal horses are quadrupeds.

This gives us a picture of Aristotle as being aware of this problem of induction. But, because of his metaphysical commitment to natural kinds with universal forms that can be grasped through perception and abstraction, he, unlike Hume, does not think it is a major or unsolvable problem.

Introduction

The traditional “problem of induction,” the problem of how one can justify a generalization that extends beyond the set of particular cases on which it is based, is one of the oldest in the history of logic and epistemology. It is at least as old as Sextus Empiricus’ work, *Outlines of Scepticism*. Further, how one should interpret the obscure last chapter, B.19, of Aristotle’s *Posterior Analytics* is a subject of much controversy. The chapter seeks to answer the question of how we come to know the principles or starting points (*archai*) of “demonstration” (*apodeixis*)—a certain kind of sound syllogistic (i.e., three-termed) deduction that is the main subject of the *Posterior Analytics*.

According to Aristotle, the principles of demonstration include the ultimate premises of demonstration. And, according to common interpretations of the “genetic account”¹ of *APo.* B.19, we come to know these ultimate premises by induction based on sense perception. Given that the function of these ultimate premises is to securely ground demonstrated knowledge (*epistêmê*), there are two crucial questions about the genetic account: (1) In the genetic account, is Aristotle

¹ The “genetic account” of *APo.* B.19 is the part of that chapter (from 100a35-b5) that evidently seeks to answer the question, asked near the beginning of the chapter (at 99b17-8), of how we come to know the principles (*archai*) of demonstration. In using the label, I do not mean to suggest that I read the account as a *psychologically* (as against epistemologically) genetic account of how we come to know the principles. The label is only intended to indicate that the account is one that describes the *generation* of certain cognitive states from certain prior cognitive states. In fact, as my reading will indicate, I view the account as epistemologically genetic, not just psychologically genetic. In using the label, I am following practice of several commentators, including D.W. Hamlyn, Greg Bayer, Deborah Modrak, and Robert Bolton.

aware of the problem of induction? (2) What, if anything, is his attempted solution to the problem? In my view, Aristotle is aware in the genetic account of the problem of induction and attempts to solve the problem. In this work, I seek to defend the thesis that Aristotle's attempted solution, in the genetic account of *APo.* B.19, to the problem of induction is based, in a certain way, on his doctrine of natural kinds. In my view, Aristotle considers particular forms to instantiate universal forms. Aristotle's attempted solution to the problem of induction, on my reading of the genetic account, consists in grasping a universal form through sense perceptions of particular forms.

This work is organized as follows. In Ch. 1, I define a certain sense of "induction" that I consider relevant to the "problem of induction" that I think Aristotle faced. I also define the "problem of induction" that I have in mind. Then, I provide evidence that Aristotle does recognize induction in the sense I define.

Beginning with Ch. 2, I criticize certain readings of the genetic account of *APo.* B.19 that conflict with my own and which are complex enough to merit special attention. In Ch. 2, I criticize D.W. Hamlyn's reading of the genetic account. In particular, there are two crucial positions of Hamlyn that I criticize. The first is that, according to the genetic account, the sense perception of one particular is sufficient to grasp the universal instantiating it. In my view, the genetic account does not claim this, but claims that the sense perceptions of many

particulars of a kind are needed to grasp the universal that they instantiate. The second is that the process described by the genetic account is not intended be a description of the induction (*epagôgê*) mentioned in *APo.* B.19. In my view, the genetic account is intended to describe the induction mentioned in that chapter. For part of my support for this view, I provide evidence that the genetic account of *APo.* B.19 is not about only the acquisition of concepts, but also of certain definitional truths connected with the concepts.

In Ch. 3, I criticize readings of the genetic account by Melbourne Evans and Orna Harari, insofar as the readings conflict with my own. Like Hamlyn, they think that according to the genetic account the sense perception of a single particular is enough to grasp the universal it instantiates. I criticize the arguments of each that this is what the genetic account claims. Further, like other commentators, both Evans and Harari think that “*nous*” in *APo.* B.19 is intended to be intuition that allows one to grasp the universal. As a consequence of this view, neither think that Aristotle deals with the problem of induction in the genetic account. I criticize the arguments of both that *nous* in *APo.* B.19 is intended to be intuition that allows one to grasp the universal.

Having cleared away certain readings of the genetic account that conflict with my own, in Ch. 4, I present my own reading and provide some initial evidence for it. Before I provide my reading, I provide strong evidence that Aristotle upheld the existence of both particular and universal forms and that he

considers particular forms to instantiate universal forms. Then I turn to my reading. On my reading of the genetic account, sense perception, not just of one, but of many particulars of a kind are needed to grasp the kind. The particular forms perceived are retained in memory and form an experience (*empeiria*). At first, the experience is undifferentiated in the sense that the form shared by all the particulars comprising it is not differentiated from other forms in one's mind. At some point, the form shared by all the particulars *is* differentiated from other forms in one's mind. This is the grasp of the universal. Connected with this is the grasp of certain definitional truths connected with the universal. These truths are ultimate premises of demonstration. This gives us a picture of the induction described by the genetic account as a process of discovery and justification. Finally, *nous*, on this reading, is not intuition that allows one to grasp the universal.

Next, in Ch. 5, I defend my reading of the genetic account. By this point, I have already defended, in Ch. 2, 3, and 4, the crucial thesis, that according to the genetic account the sense perception of, not just one, but many particulars of a kind, is needed to grasp the kind. In Ch. 5, I defend my view that an experience formed from sense perceptions has, as its object, not one, but many particulars. I also defend my view that the "undifferentiated items" (*adiaphora*) mentioned in the account are experiences whose forms have not been differentiated from other forms in one's mind. Further, I defend my view that the induction described by

the account has a justificatory role, not just one of generalizing. Finally, I defend my view that *nous* in *APo.* B.19 is not intended to be intuition that allows one to grasp the universal, and which thereby solves or allows one to avoid the problem of induction.

Next, in Ch. 6, I consider two conceptions of Aristotelian induction that are not based on readings of the genetic account but which conflict with my reading of that account. The first conception is William Whewell's. I criticize his view that, as a consequence of not considering induction to be rationally justified, Aristotle regarded inductive truths as perceived truths and not reasoned truths. I present strong evidence that Aristotle did regard inductive truths as reasoned truths. The second conception is John McCaskey's. I argue against two of McCaskey's theses. I argue against his thesis that *all* inductions for Aristotle involve predicating a distinctive property of a subject kind, indicating that the evidence does not support this claim. And, I argue against McCaskey's thesis that any induction for Aristotle that is not a kind of deduction does not involve any problem of induction.

Finally, having defended my reading of the genetic account of *APo.* B.19, in Ch. 7, I explicitly identify the implications, of my reading of that account, with regard to the question of whether, in the account, Aristotle is aware of the problem of induction and what (if anything) is his attempted solution to the problem. I then consider and answer certain objections to my view of what

Aristotle's attempted solution, in the genetic account, to the problem of induction is.

Chapter 1: Aristotle's Recognition of the Concept of Induction

I. Introduction

In this chapter, I will seek to define a certain sense of “induction,” state what I mean by the “problem of induction” (i.e., which “problem of induction” I have in mind), and provide strong evidence that Aristotle does recognize “induction” in my defined sense.

In Section II, I will define the sense of “induction” that I have in mind. In Section III, I will define what I mean by the “problem of induction.” In Sections IV and V, I will identify and name certain theses about reasoning (roughly, about induction and deduction) that I think Aristotle held, and provide evidence that he held these. In Section VI, I will provide evidence that Aristotle held a sense-based epistemology as context for understanding the following section. In Section VII, I will provide some direct textual evidence that Aristotle recognized “induction” in the sense I define in Section I (though not that he necessarily recognized *only* that sense of induction). In Section VIII, I will answer an objection, based on a reading of *APr. B.23*, that Aristotle considers all induction to be “perfect induction” (which is not the sense of “induction” I define in Section I). Finally, in Section IX, I will offer my conclusion.

II. Induction as Reasoning from the Particular to the General

For supporting my thesis that Aristotle evidently had a certain implicit, attempted solution to the problem of induction, I use “induction” in a certain specific sense. After I state what I mean by “the problem of induction,” I will provide evidence that this is a sense that is subsumed by his term “*epagôgê*” (which he describes as reasoning from the particular to the universal and contrasts with “*sullogismos*,” typically translated as “deduction”¹).

The sense I have in mind is that of (i) reasoning from propositions (the premises) that are more particular to a proposition (the conclusion) that is more universal, (ii) in cases where the premises all predicate a certain property of particular instances or species of the subject of the conclusion and the conclusion predicates the same property of its subject, and (iii) where one does not have such premises in regard to *all* of the particular instances or species.² An example will indicate the sort of reasoning I have in mind: inferring that all animals are mortal from such premises as: all humans are mortal; all dogs are mortal; all chickens are

¹ When I provide evidence that Aristotle recognized “induction” in the sense I define, I will discuss in more detail what he means by this description, and provide evidence that he held this description and contrasted *epagôgê* with *sullogismos*.

² The *Oxford English Dictionary* quoted in the online *Stanford Encyclopedia of Philosophy* gives the following as a statement of one of the definitions of “induction”: “7. *Logic a.* The process of inferring a general law or principle from the observation of particular instances (opposed to DEDUCTION, q.v.).” (John Vickers, “The Problem of Induction,” *The Stanford Encyclopedia of Philosophy* (Fall 2010 Edition), ed. Edward N. Zalta, forthcoming URL = <<http://plato.stanford.edu/archives/fall2010/entries/induction-problem/>>. Italics, boldface, and caps are in the original.) This indicates that the conception of induction as reasoning from particular facts to a universal generalization, while incorrect according to the contemporary view of induction, is hardly a novel conception.

mortal; and other such premises that one might have. Each of the premises claims that animals of a given species are mortal, and one does not have such premises in regard to *all* species of animals. I will discuss the numbered parts of my definition in more detail below.

In Condition i in my definition, note that I describe the process of “induction” as reasoning from *propositions* to a *proposition*. This is to distinguish what I mean by “induction” from “reasoning” from object items (such as human, horse, chicken, etc.) to an object item (such as animal). A process of “thought” such as “human, horse, chicken; therefore animal” is not what I mean by “induction” in the sense that I am defining it.

As with deduction, in induction, the propositions from which one reasons are *premises*, and the proposition to which one reasons is the *conclusion*.³

By “more particular premise,” in this sort of reasoning, I mean one whose quantified subject is narrower than the quantified subject of the conclusion. For example, the premise “this emerald [referring to an individual emerald] is green” is “more particular” than the conclusion “all emeralds are green,” which is “more universal” than the premise. The premise “all horses are mortal” is “more

³ By stating that “induction” in the sense I am defining has premises and a conclusion, I do not mean to suggest that it is necessarily an *articulated* argument. “Induction” in the sense I am defining subsumes induction as a process of discovering a general putative truth through the sense perception of instances (also known as “ampliative induction”). In such a case, the premises will likely be only implicit (rather than articulated), and the conclusion may also be implicit as well.

particular” than the conclusion “all animals are mortal,” which is “more universal” than the premise.

To be clear, by “more particular premise,” I am not referring to types of statements discussed in *On Interpretation*, if they are interpreted, as they are by some commentators, as being intended instances of “indefinite” statements.

Examples of such statements are “man is white,” and “emerald is green.” These are statements without a quantifier (whether “all,” “some” or other quantifier) and do not refer to a particular thing (whether an ultimate particular or a particular species of some genus). They may accordingly be considered “indefinite” propositions.^{4, 5}

⁴ J.L. Ackrill in Aristotle, *Categories and De Interpretatione*, trans. and ed. J.L. Ackrill, et. al. (New York, NY: Oxford University Press, 1968), 17b37-18a17 and 19b19ff translates such statements as “a man is white” or “a man is just,” though there are no indefinite articles in these statements in the OCT Greek texts. (Unless otherwise noted, any further reference to a translation of *Categories* or *On Interpretation* and any further reference to a work by Ackrill will be to this work.) Further, Ackrill translates “*kath’ hekasta*” at *DI*, 17b40 in the usual way, i.e. as “particular.” This suggests that Aristotle gives “man is white” and “man is not white” (at 18a5-6, trans. mine) and “man is just” and “man is not just” (at 19b20-1, 19b27-9, trans. mine) as examples of “particular” statements. This is the reason for my clarification in the above paragraph. Ackrill, in his commentary, refers to these statements like “man is just,” apparently correctly, as “indefinite” statements (Akrill, 129).

⁵ All of my references to Greek texts of Aristotle’s works will be to the following editions of Oxford Classical Texts: Aristotle, *Analytica Priora et Posteriora*, ed. W.D. Ross (New York, NY: Oxford University Press, 1964); Aristotle, *Ars Rhetorica*, ed. W.D. Ross (Oxford: Oxford University Press, 1959); Aristotle, *Categoriae et Liber de Interpretatione*, ed. L. Minio-Pauluello (New York, NY: Oxford University Press, 1949); Aristotle, *De Anima*, ed. W.D. Ross (Oxford: Oxford University Press, 1963); Aristotle, *Ethica Nicomachea*, ed. I. Bywater (New York, NY: Oxford University Press, 1894); Aristotle, *Metaphysica*, ed. W. Jaeger (New York, NY: Oxford University Press, 1957); Aristotle, *Physica*, ed. W.D. Ross (New York, NY: Oxford University Press, 1950); and Aristotle, *Topica et Sophistici Elenchi*, ed. W.D. Ross (New York, NY: Oxford University Press, 1958).

Further, by “more particular premise,” I am not referring to the types of statements, often called “particular,” discussed in the *Prior Analytics*, which are quantified by “some.” An example of such a statement is “some emeralds are green.” As Robin Smith remarks, it is traditional in Aristotle translation and commentary to refer to such statements as “particular.” “Particular” in such cases is a translation of a Greek phrase (“*kath’ hekaston*”) that is more literally translated “of the part” (just as “universal” used to refer to statements with a universal quantifier is a translation of a Greek word (“*katholou*”) more literally translated “of the whole.”)⁶ But if statements quantified with “some” are “particular,” they are “particular” in a different sense than the sense I use in “more particular premise.”

Observe that I stated that the premises are *more* particular, and that the conclusion is *more* universal. This means that the premises are particular *in relation* to the conclusion, and that the conclusion is universal *in relation* to each of the premises. This means that the premises do not have to be about *ultimate* particulars. Thus, consider this series of premises: “all humans are mortal,” “all dogs are mortal,” etc. I do not have such premises in regard to *every* sort of animal. I draw the conclusion that all animals are mortal. The immediate subjects of my premises are not ultimate particulars, but species (consisting of

⁶ See Aristotle, *Prior Analytics*, trans. Robin Smith (Indianapolis, IN: Hackett Publishing Co., 1989), XVII-XVIII. Unless otherwise noted, any further reference to a translation of the *Prior Analytics* or to a work by Robin Smith (1989) will be to this work.

individuals). Nevertheless, these subjects *are* particular in relation to the universal conclusion, which is not about some particular species of animal,⁷ but *all* animals. Nevertheless, an “induction” in the sense I am defining *can* be from premises that are particular in the ultimate sense (but which are also particular *in relation* to the conclusion). The following is an example: Socrates was mortal; Pericles was mortal; Alcibiades was mortal; therefore, all humans are mortal.

Condition ii of my definition states that each of the premises must predicate a certain property of an instance or species of the subject kind of the conclusion, and that the conclusion must predicate the same property of its subject. For an illustration of this requirement, consider again my sample induction from animals of various species being mortal to the conclusion that all animals are mortal. The subject kind is given by the conclusion; in this case, it is animals. Though, the ultimate members of the subject kind are individual animals, more ‘immediate’ members of the subject kind are various species of animals: humans, dogs, chickens, etc. The premises each predicate a certain property—mortality—of a species of the subject kind. The conclusion—that all animals are mortal—predicates the same property of the subject kind. Consider a different example: this dolphin is a mammal; this (other) dolphin is a mammal; this (other)

⁷ For my use of “species” and “genus” throughout this work, I do not necessarily mean “species” or “genus” in the sense used in contemporary biological taxonomy, but merely in Aristotle’s more general sense of a sort or class (the species) within a wider, sort or class (the genus) that is part of the definition of the species.

dolphin is a mammal; etc.; therefore, all dolphins are mammals. The subject kind, in this case, is dolphin. The premises all predicate a certain property—that of being a mammal—of members (i.e., particular dolphins) of the subject kind. The conclusion—that all dolphins are mammals—predicates the same property of the entire subject kind.

Condition iii of my definition states that one does not have premises about *all* members of the subject kind. Consider again my sample induction from animals of various species being mortal to the conclusion that all animals are mortal. For this to be an “induction” in the sense I am defining, we must assume that we do not have premises about *all* the animal species. We may have premises about *many* animal species—such as humans, dogs, chickens, and other species—but not *all* animal species. Consider another example: this emerald is green; this (other) emerald is green; this (other) emerald is green [followed by other such premises]; therefore, all emeralds are green. For this to be an “induction” in the sense I am defining, we may have such premises in regard to thousands of individual emeralds, but not in regard to *all* emeralds. In other words, for this to be an “induction” in the sense I am defining, this cannot be what is called a “perfect induction.”

Let me now modify the sense of “induction” I have defined so far in a certain way, a way that allows it to include arguments where the conclusion is not universally quantified, but quantified with “most.” In connection with this,

inductions of the sort that reach a conclusion whose quantified subject is broader than that of the premises, but whose quantifier is “most” (rather than “all” or “every” or other universal quantifiers), satisfy Condition i. An example of an induction of this sort would be: Socrates reasons; Alcibiades reasons; so, most humans reason. The subjects of the premises (Socrates and Alcibiades) are more particular than the quantified subject of the conclusion, “most humans.” Another example would be: all cats have hair; all dogs have hair; all horses have hair; so, most mammals have hair. The quantified subjects of the premises—all cats, all dogs, and all horses—are each more particular than the quantified subject of the conclusion—most mammals.⁸

Condition ii—that the premises each predicate a certain property of an instance or species of the subject kind of the conclusion and that the conclusion

⁸ My concern in this work, again, is: what, if anything, did Aristotle hold as the solution to the problem of induction in his genetic account of coming to know principles of demonstration in *APo.* B.19? The reason I mention here inductions with conclusions quantified with “most” is that Aristotle mentions in *APo.* B.12 at 96a8ff that the predication in some principles holds only “for the most part” (*APo.*, 96a18). (Aristotle, *Posterior Analytics*, trans. and ed. Jonathan Barnes (New York, NY: Oxford University Press, 2002). Unless otherwise noted, any further reference to a translation of the *Posterior Analytics* or to a work by Barnes (2002) will be to this work.) Similarly, in *Met.* E.2, Aristotle says that “all science [*epistêmê*] is either of that which is always or of that which is for the most part” (*Met.*, 1027a20-1). (Aristotle, *Metaphysics*, trans. W.D. Ross in Aristotle, *The Complete Works of Aristotle*, Vol. II, ed. Jonathan Barnes (Princeton, NJ: Princeton University Press, 1995), 1552-728. Unless otherwise noted, any further reference to a translation of the *Metaphysics* will be to this work.) How such remarks should be interpreted is controversial, but one way to interpret them is to take them as implying, in part, that some principles of demonstration have a quantifier of “most” rather than a universal quantifier. Hence, I consider inductions leading to conclusions quantified with “most” in order to accommodate this interpretation.

predicates this same property of its subject kind—remains the same for inductions whose conclusions are quantified with “most.”

Condition iii, however, for inductions with a conclusion quantified with “most” is different than it is for those with a conclusion with a universal quantifier. Condition iii for the former is that one has premises for *less than most* instances or species of the subject kind of the conclusion. Consider my induction above that most humans reason. I give two premises, each of an individual human. Clearly, this satisfies Condition iii for inductions with conclusions quantified with “most.” Consider also my induction above that most mammals have hair. My premises are of three species of mammals. If we assume Aristotle’s doctrine of natural kinds, there seem to be more than six such species of mammals. Thus, given Aristotle’s doctrine of natural kinds, this induction also appears to satisfy Condition iii for inductions with conclusions quantified with “most.”

Let me now restate my definition of the sense of “induction” I have in mind, taking into account my modification. “Induction” in the sense I am defining is: (i) reasoning from propositions (the premises) that are more particular to a proposition (the conclusion) that is more universal, (ii) in cases where the premises all predicate a certain property of particular instances or species of the subject of the conclusion and the conclusion predicates the same property of its subject, and (iii) where one does not have such premises in regard to *all* of the

particular instances or species in case the conclusion is universally quantified, or one has premises for *less than most* of the particular instances or species in case the conclusion is quantified with “most.”

In summary, my special sense of “induction” is the sense of what could be called “imperfect inductive generalization” (as against “perfect induction” and other senses in which “induction” may be used). A “perfect induction” is one in which one enumerates *all* of the particular instances or species that the conclusion subsumes.⁹ The following is an example: Mercury has an elliptical orbit; Venus has an elliptical orbit; Mars has an elliptical orbit; Jupiter has an elliptical orbit; Saturn has an elliptical orbit; these are all the planets that exist¹⁰; so all the planets have an elliptical orbit. An “imperfect inductive generalization” is an inductive generalization in which one does enumerates less than all the particulars subsumed by the conclusion, in case the conclusion is universally quantified, or less than most in case the conclusion is quantified with “most.” Examples of this are my sample inductions that all emeralds are green, that all animals are mortal, that most humans reason, and that most mammals have hair, given above.

⁹ In an inductive generalization where one is seeking to reach a conclusion quantified with “most,” a *perfect* inductive generalization is one in which one enumerates at least *most* of the relevant particulars, and knows when one has done so.

¹⁰ I am adding this premise in this example because, presumably, one is not justified in treating a “perfect induction” as “perfect” unless one *knows* that it is perfect, i.e. that the other premises enumerate *all* instances or species of the subject kind of the conclusion.

In defining the sense of “induction” I have in mind, I do not mean to imply that Aristotle recognizes *only* this sense of induction. But, as we will see later in this chapter, there is strong evidence that Aristotle does recognize this sense, and, as my next section makes clear, this is the sense that is relevant to the “problem of induction” I have in mind

III. The Problem of Induction

The “problem of induction” I have in mind in connection with Aristotle is the primarily problem of how, given an “induction” in the sense I defined in the last section, one can justify the inference to the conclusion. It is a problem because many such “inductions” that are made (such as an induction that all round objects can roll on a flat surface given normal terrestrial conditions, or the induction that most horses have four legs) *seem* as though they are legitimate for reaching conclusions that are certainly true. Yet unlike in a valid deduction, the negation of the conclusion in such inductions is consistent with the conjunction of all of the premises. The salient source of this problem is that fact that an “induction” in the sense I have defined satisfies Condition iii. That is, the salient source of the problem is that fact that the induction does not consist of premises of *all* the instances or species of the subject kind of the conclusion (in case the conclusion is universally quantified) or consists of premises of *less than most* of the instances or species of the subject kind of the conclusion (in case the

conclusion is quantified with “most”). Put differently, the salient source of this problem is that fact that an “induction” in the sense I have defined is an *imperfect* inductive generalization.

It may be observed that the “problem of induction” I have just defined is, more or less, the “traditional” problem of induction. It is nothing new. In fact, it seems that the author of this problem in the history of philosophy was Sextus Empiricus (or one of the earlier Pyrrhonian Skeptics¹¹). In his *Outlines of Scepticism*, Sextus writes:

It is easy, I think, to reject the method of induction. For since by way of it they want to make universals convincing by way of particulars, they will do this by either surveying all the particulars or some of them. But if some, the induction will be infirm, it being possible that some of the particulars omitted in the induction should be contrary to the universal; and if all, they will labor at an impossible task, since the particulars are infinite and indeterminate. Thus in either case it results, I think, that induction totters.¹²

It *seems* that the only difference between the problem of induction that I have described myself above and that identified in this quote by Sextus is that I intend to include in the problem inductions with conclusions quantified with

¹¹ I make this qualification because it is unclear whether in *Outlines of Scepticism*, where Sextus seems to explicitly present the problem, he is posing a problem which he is the first to explicitly identify and present or whether he is merely reporting a problem explicitly identified by one or more of the earlier Pyrrhonian Skeptics.

¹² Sextus Empiricus, *Outlines of Scepticism*, trans. Annas, Julia and Jonathan Barnes (Cambridge, UK: Cambridge University Press, 1994), 123. The use of the terms “particulars” and universals” may raise the question about whether Sextus has in mind particular and universal *objects* or *propositions*. But what the passage proceeds to say (especially the clause, “it being possible that some of the particulars omitted in the induction should be contrary to the universal”) suggests that he at least means to *include* particular and universal propositions in his reference.

“most,” whereas Sextus seems to include inductions only with universally quantified conclusions.¹³ But the problem of induction I have identified seems to be essentially the same problem that Sextus writes about above.

More recently, the traditional problem of induction has been associated with David Hume. Hume, however, typically poses the problem as one of establishing with certainty the connection between an antecedent cause and a successive effect.¹⁴ This involves putting the problem in temporal terms, i.e. in terms of past and future phenomena. An instance of the problem as Hume might express it might be as follows. Even if one has seen, numerous times, one billiard ball move each time it had been struck by another, how can one be *certain* that upon seeing in the future a billiard ball struck by another that it will move?¹⁵ Hume posing the problem in such a temporal manner is apparently a consequence

¹³ Perhaps another difference is that part of what this quote suggests is the *impossibility* of surveying (i.e., obtaining true premises of) all the particulars (such as particular emeralds) subsumed by a universal (such as emerald). But this suggestion does not contradict the statement of the problem of induction as I present it myself above. In my statement of the problem, I merely leave open the question of *why* one has not surveyed all (or most) of the particulars. However, as we will see in the proceeding sections, there is strong evidence that Aristotle considered it impossible to survey all (or even most of) the specimens of many species, in part because the number of specimens is potentially infinite. And, as will be indicated in a later chapter, this is part of the evidence that Aristotle was aware of this problem of induction in his account of coming to know principles of demonstration in *APo.* B.19.

¹⁴ See David Hume, *Enquiries Concerning Human Understanding and Concerning the Principles of Morals*, eds. Nidditch, P.H. and L.A. Selby-Bigge (New York, NY: Oxford University Press, 2003), 26-32. (Any further reference to Hume will be to this work.) Further, Hume does not use the term “induction” to refer to such reasoning, but typically refers to it as “causal reasoning” or “reasoning about cause and effect.”

¹⁵ See Hume, 28-31 where Hume offers this example of the problem.

of several of the basics of his epistemology. These include his skepticism about the existence of a material world (or *any* world) independent of phenomena experienced. The only certainties at the start of cognition are the existence of various sense “impressions,” which, as time passes, are constantly replaced by other sense impressions.¹⁶ Again, Hume’s posing the problem of induction in temporal terms is apparently a consequence of such an epistemological foundation. For on such an epistemological foundation, the only basic items of reference are a succession of sense impressions.^{17, 18}

I do not pose the traditional problem of induction the way Hume does because the Humean epistemological foundation that I describe above is very evidently not shared by Aristotle. Aristotle does not ever seem to doubt the existence of a world independent of sense perception. Aristotle, in other words, seems to think it is obvious that the world perceived by the senses is real and

¹⁶ When Hume begins offering his substantive arguments in the *Enquiry*, he seems to assume that the existence of a world independent of a perceiver cannot be taken for granted, but must be inferred (Hume, 17-32). Hume calls sense perceptions and other of “our more lively perceptions,” such as will or feelings of desire, love, hate, etc., “impressions” (Hume, 18). He calls the “less lively perceptions,” i.e., phenomena such as memory images and conceptual ideas that he thinks are “copies” of impressions, “ideas” or “thoughts” (Hume, 18).

¹⁷ Thus, when Hume writes of “seeing” or “observing” motion in a billiard ball when he presents his example involving billiard balls (Hume, 29-31), we should take him to mean “having the impression of motion in a billiard ball.”

¹⁸ It may be objected that Hume’s point is really not to raise the traditional problem of induction again, but to cast skeptical doubt onto attempted solutions of the problem. (For example, Hume considers and criticizes the attempt to solve the problem by applying geometry (Hume, 31-2).) This might be true, but Hume apparently does raise the problem again, presenting it in a different way than Sextus does.

exists regardless of whether a subject perceives it. When we add to this Aristotle's position (which he seems to take as obvious) that the world is naturally organized into kinds, into universals immanent in material particulars, and that we can have knowledge of these kinds, it is hardly surprising that he formulates a categorical (as against, for example, a hypothetical) logic. As a result, it is more natural to think of the traditional problem of induction, as it might be relevant to Aristotle, in categorical terms (which is how I have defined it above) rather than temporal terms (as Hume typically poses the problem).¹⁹

Accordingly, throughout this work, when I mention "the problem of induction," I am using the phrase in the sense that I have defined above.²⁰

¹⁹ I do not mean here that Aristotle would *never* pose the traditional problem of induction (or an instance of it) the way Hume does. I mean only that because Aristotle does not share the basics of Hume's epistemology (as I have described them above), and in particular because he seems to take the existence of natural kinds and our ability to know them as obvious, it is more *natural* to think of the traditional problem of induction, as it might be relevant to Aristotle, in categorical terms.

²⁰ Thus, it is clear that by "problem of induction," throughout this work, I am not referring to Nelson Goodman's new "Riddle of Induction." According to Goodman, if we define a concept such as "grue," for example, which refers to green up to a certain time *t*, but to blue after *t*, it seems difficult or impossible to develop a rule that would justify an inference to the conclusion that all emeralds are grue from past observations of emeralds always being grue. Having observed countless emeralds before *t* each being green (and grue), we would consider it legitimate to conclude that all emeralds after *t* would be green. But we would not consider it legitimate to conclude that all emeralds after *t* would be grue. It seems that the sort of formal rule of inference that could be used to justify the first inference (which would be acceptable to us) could also be used to try to justify the second (which would be unacceptable to us). (See Nelson Goodman, *Fact, Fiction, and Forecast*, 2nd ed. (Indianapolis, IN: The Bobbs-Merrill Co., 1965), especially pp. 59-83.) It does not seem as though Aristotle would consider this a problem since he apparently would consider green and blue (for example) to be two different natural kinds, as a result of having two different universal forms, and would not consider "grue" to be a veridical concept (i.e., one that reflects a natural kind) which is what must comprise principles that are ultimate premises of demonstration. One may, of course, object that Aristotle's doctrine of natural kinds is not viable, and so, upon realizing this, he must deal with Goodman's problem. This might be true, but in any case, Goodman's riddle as it pertains to Aristotle is a subject outside the scope of this work,

IV. The Difference Thesis About *Epagôgê* and *Sullogismos*

There is evidence that, at least sometimes, Aristotle uses “*epagôgê*” (the Greek term usually translated as “induction” in Aristotle’s works) to refer to induction in the sense I defined in Section I.

To see that Aristotle recognizes “induction” in the sense that I have defined, it is helpful to bear in mind a view he evidently holds in regard to the difference between *epagôgê* and *sullogismos*. I call this the Difference Thesis. Further, since Aristotle sometimes mentions two distinctions in the same passage, I have divided the Difference Thesis into two sub-theses, the Direction Thesis and the Necessity Thesis. The Direction Thesis is that *epagôgê* and *sullogismos* are distinguished by the fact that *epagôgê* consists of moving logically from the particular to the universal while *sullogismos* consists of moving logically *from the universal* to a conclusion that is equally universal or more particular.^{21, 22} The Necessity Thesis is that *epagôgê* and *sullogismos* are distinguished also by the

which is on whether and how Aristotle deals with the traditional problem of induction, as I have defined it, in his account of coming to know principles in *APo.* B.19.

²¹ “Logically” in this context should be understood in contradistinction to “chronologically.” Thus, the Difference Thesis does not make any claim about whether one mentally considers a particular or universal first in time, but whether a more particular or universal (term or proposition) is the basis of the inference that one is making.

²² Stated in this way, this sub-thesis leaves unanswered the question of whether Aristotle is referring by “the particular” and “the universal” to terms or propositions or both. We will see later that Aristotle must be referring to propositions or both terms and propositions, but cannot be referring just to terms. The evidence that he holds the Direction Thesis in regard to deduction, in particular, strongly suggests that this thesis is about propositions. It also leaves unanswered the question of whether Aristotle is using “particular” and “universal” in an absolute or relational sense. (We will see evidence later that the sense is relational.)

fact that in a *sullogismos*, by its essence, the conclusion follows of necessity (“*ex anankês*”) from the premises, while no such necessity applies to *epagôgê* as *such*.²³

I will first provide strong textual evidence that Aristotle holds these theses. As I will argue later, if Aristotle does, this provides some evidence that he at least sometimes recognizes *epagôgê* as imperfect inductive generalization. I will then cite passages from Aristotle’s works that evidently contain examples of *epagôgê* as imperfect inductive generalization.

V. Evidence that Aristotle Holds the Difference Thesis

What is the evidence that Aristotle held the Difference Thesis? One piece of evidence that he held the Direction Thesis (one part of the Difference Thesis) is a passage early in *Posterior Analytics*:

...they [both syllogistic and epagogic arguments] affect their teaching through what we already know, the former assuming items which we are assumed to grasp, the latter proving something universal by way of the fact that the particular cases are plain. (*APo.*, 71a5-9)

This passage provides evidence that he held part of the Direction Thesis, namely that *epagôgê* consists of moving from the particular to the universal. Another piece of evidence for the same point is found in *Topics*:

²³ This, however, does not rule out Aristotle thinking that in some *epagôgai*, namely those which are *perfect* inductions (as some have interpreted the example of the *epagôgê* in *APr.* B.23 to be), the conclusion *does* follow from necessity from the premises. *APr.* B.23 will be discussed in the last section of this chapter.

...we need to distinguish how many kinds of dialectical argument [*logôn*] there are. One kind is *induction* [*epagôgê*], another is *deduction* [*sullogismos*]. Now, what a deduction is was explained earlier. [The reference, presumably, is to *Top.* I, 100a25-7.] Induction, however, is proceeding from particulars up to a universal. (*Top.* I, 105a10-4, italics in original)²⁴

There is more evidence a little later in *Topics*. As one of the steps of a dialectical discourse, Aristotle recommends finding similarities among cases.²⁵ In connection with this, he writes:

The study of what is similar is useful for inductive arguments [*tous epaktikous logous*], for deductions [*sullogismous*] from an assumption, and for giving definitions. It is useful for inductive arguments because it is by induction [*epagôgê*] from particular premises about similar things that we claim a right to induce [*epagein*] the universal: for it is not easy to induce if we do not know the similar things. (*Top.* I, 108b7-12, trans. mine)

It seems that the most straightforward reading of the part of the second sentence before the clause is: similarity is useful for inductive arguments, because it is from similar particular facts that we claim a right to induce a universal conclusion. The passage states that “it is by induction [*epagôgê*] from particular premises about similar things that we claim a right to induce [*epagein*] the

²⁴ Aristotle, *Topics Books I and VIII*, ed. and trans. Robin Smith (New York: Oxford University Press, 1997). (Unless otherwise noted, any further reference to *Topics* I and VIII will be to this work.) In regard to the bracketed sentence, it is reasonable to think that Aristotle is referring to the passage from *Top.* I, 100a25-7. It is reasonable because that prior passage from the *Topics* is the only *Topics* passage prior to this one that contains a description or definition of *sullogismos*.

²⁵ In *Topics* I.17, Aristotle recommends finding similarities between things in different genera (and, evidently, his examples of such things are eye, soul, sea, and air) and between things in the same genus (and, evidently, his examples of such things are a human, a horse, and a dog). See *Top.* I, 104a34-9.

universal...” (Emphasis is added.) Note the italicized word: we induce *from* particular premises, the passage states. This, it seems, indicates only a view of *epagôgê* as logically moving from the more particular to the more universal. It seems irreconcilable with a view of *epagôgê* as logically moving from the universal to the more particular, or to the equally universal. Thus, it seems, we have further evidence that Aristotle held the first part of the Direction Thesis.

A passage providing evidence to support the *entirety* of the Direction Thesis can be found in *Nicomachean Ethics*:

Now induction [*epagôgê*] is of first principles and of the universal and deduction [*sullogismos*] proceeds *from* universals. (*EN*, 1139b28-30)²⁶

In connection with the passages on *epagôgê* just quoted above, I think it is clear that the claim that *epagôgê* is “of the universal” [*tou katholou*] should be understood to mean that we *induce* (i.e., *epagomen*) *universals* (rather than the more general claim that *epagôgê* involves universals). What brings this out is the contrast with *sullogismos*—that *sullogismos* “proceeds *from* universals.”²⁷

²⁶ Aristotle, *Nicomachean Ethics*, trans. W.D. Ross, rev. J.O. Urmson in Aristotle, *The Complete Works of Aristotle Vol. II*, ed. Jonathan Barnes (Princeton, NJ: Princeton University Press, 1995), 1729-867. Unless otherwise noted, any further reference to a translation of the *Nicomachean Ethics* will be to this work.

²⁷ I do not spend much space providing evidence that Aristotle held the *second* part of the Direction Thesis (i.e. that deduction consists of moving logically from the universal) because my main concern in this chapter is to provide evidence that he recognizes *induction* in the sense I defined in Section I. For this task, that Aristotle held the first part of the Direction Thesis is much more significant than his holding the second part. However, there is much *additional* evidence that he held the second part readily available in Robin Smith’s commentary in his translation of the *Prior Analytics*. Smith provides a table of all of the valid deductive forms that Aristotle explicitly recognizes (and all of these are three-term syllogistic forms). All of them contain at least one

For the Necessity Thesis, there is explicit textual evidence that Aristotle held that in a *sullogismos*, the conclusion follows of necessity from the “things laid down” (i.e., the premises). The evidence that he held that in *epagôgê*, the conclusion does not necessarily follow of necessity from the premises is only implicit. It is implicit in the fact that the necessity mentioned seems to be part of what Aristotle considers to be the definition or the “what it is”—and hence *distinctive* characteristic in his view²⁸—of “*sullogismos*.”

One piece of evidence that Aristotle held the Necessity Thesis is found in *Prior Analytics*:

...a deduction [*sullogismos*] is an argument [*logos*] in which certain things being supposed, something different from the suppositions results *of necessity* through these things being so. (*APr.*, 24b18-20, emphasis added, trans. mine)

universal premise that is as universal as or more universal than the conclusion (Smith (1989), 230-5).

²⁸ The main evidence that Aristotle takes the necessity of a conclusion following from premises to be part of the “what it is” of a deduction (*sullogismos*) is found in two places: *Prior Analytics* A.1 and *Topics* A.1. In both of those chapters, Aristotle says that we must say *what a deduction is* (see *APr.* 24a12-3 and *Top.* I, 100a21-4), and then proceeds to claim that what a deduction is, is an argument in which a conclusion follows of necessity from things laid down. See *APr.* 24b18-20 and *Top.* I, 100a25-7. Both of these passages will be discussed in more detail shortly. Regarding evidence that Aristotle held that the “what it is” of a thing is distinctive to that thing, the most explicit evidence is in *Top.* I.4. There, Aristotle considers the concept of a *unique property* (or *peculiarity*) of a thing, and states that one type of a unique property is a definition, which designates the ‘what it is’ of the thing, and the other type may simply be called ‘unique property’ after the wider class. (*Top.* I, 101b11-25) At the beginning of Ch. I.5, he states again that the definition of a thing signifies its ‘what-it-is-to-be.’ Other parts of the corpus, such as *APo.* A.4, and *Met.* Z, that mention the ‘what it is’ or ‘what it is to be’ seem to be perfectly consistent with its being a distinctive feature of a thing. Indeed, it would be bizarre if Aristotle did *not* consider the ‘what it is’ of a thing—i.e. the defining characteristic of the thing—as distinctive to that thing.

We should notice that he is stating the “what it is” of *sullogismos* and thereby *defining* (and not merely offering a description of) *sullogismos*.²⁹ A similar passage can be found in *Topics*:

A *deduction* [*sullogismos*]...is an argument [*logos*] in which certain things being supposed, something different from the suppositions results of *necessity* through them. (*Top.* I, 100a25-7, 1st italics in original; 2nd italics outside of brackets added)³⁰

Now observe that Aristotle in several places contrasts *sullogismos* and *epagôgê*, and in none of those places does he state that the conclusion of an *epagôgê* follows of necessity from things supposed or laid down (i.e. from the premises). One such place is the passage at *APo.*, 71a5-9, quoted above. Another such place is a passage from *Topics* quoted above, which is worth quoting again:

...we need to distinguish how many kinds of dialectical argument [*logôn*] there are. One kind is *induction* [*epagôgê*], another is *deduction* [*sullogismos*]. Now, what a deduction is was explained earlier. Induction, however, is proceeding from particulars up to a universal. (*Top.* I, 105a10-4)

Note that in this passage, Aristotle contrasts *sullogismos* and *epagôgê*. Further, in stating what *epagôgê* is, he does not (as with *sullogismos* earlier) claim that in *epagôgê*, the conclusion follows of necessity from the premises.

²⁹ Prior to that passage, Aristotle states, “...we must first determine...what a deduction [*sullogismos*] is...” (*APr.*, 24a12-3) Then, in the passage, he states what a *sullogismos* is.

³⁰ Again, before this passage, Aristotle states, “First, then, we must state what a deduction [*sullogismos*] is...” (*Top.*I, 100a22-3) Then, in the passage, he states what a *sullogismos* is.

We should note another passage contrasting *epagôgê* and *sullogismos*, found in the *Rhetoric*:

With regard to persuasion achieved by proof or apparent proof: just as in dialectic there is induction [*epagôgê*] on the one hand and deduction [*sullogismos*] or apparent deduction on the other, so it is in rhetoric. The example [*paradeigma*] is an induction, the enthymeme [*enthumêma*] is a deduction, and the apparent enthymeme is an apparent deduction; for I call a rhetorical deduction an enthymeme, and a rhetorical induction an example. (*Rhet.*, 1356a37-b5)³¹

This passage does not contain any explicit evidence that Aristotle considers the conclusion of a *sullogismos* to follow of necessity. But like the passages at *APo.*, 71a5-9 and *Top.* I, 105a10-4, referred to above, it *contrasts* *epagôgê* and *sullogismos*, and does not state or imply that in an *epagôgê*, the conclusion follows of necessity from the premises.

Consider again the explicit evidence that Aristotle considers the conclusion in a *sullogismos* to follow of necessity from the premises. In connection with that evidence, the *lack* of evidence that he considers the conclusion in an *epagôgê* to necessarily follow of necessity from the premises, combined with the passages above that *contrast* *epagôgê* and *sullogismos*,

³¹ Aristotle, *Rhetoric*, trans. W. Rhys Roberts in Aristotle, *The Complete Works of Aristotle Vol. II*, ed. Jonathan Barnes (Princeton: Princeton University Press, 1995), 2152-169. Unless otherwise noted, all further references to a translation of the *Rhetoric* will be to this translation. Roberts or Barnes notes, in a footnote, that this passage is regarded as later addition to the text of *Rhetoric* by Aristotle himself.

strongly suggests that he does *not* consider the conclusion in an *epagôgê* to necessarily follow of necessity from the premises.³²

Finally, in connection with the above evidence that Aristotle held the Necessity Thesis, we should consider another passage from *Topics* that seems like corroborating evidence. This passage is shortly after the passage of 105a10-4, quoted above:

Induction [*epagôgê*] is more persuasive, clearer, more intelligible in the way perception is, and commonly used by the public; deduction [*sullogismos*] is more coercive and more effective with those skilled in contradicting. (*Top.* I, 105a16-9)

In connection with the evidence above that Aristotle held the Necessity Thesis, we can make sense of the clause about deduction (*sullogismos*) in a certain way. It makes sense if it is understood as saying that an interlocutor, who is skilled in identifying contradictions in his opponent when engaging in dialectic, will find *sullogismos* useful. Why? Because the nature of *sullogismos* is such (as we see Aristotle indicating in the quotes prior to the one above) that if one's opponent accepts the premises, he or she *must*, to avoid contradicting them, accept the

³² The point of this is not to argue from silence that Aristotle did *not* consider the conclusion of a good *epagôgê* to be necessitated by its premises, but that this is consistent with his taking such necessity to be a distinctive, indeed part of the defining, characteristic of *sullogismos*. Such a position, in connection with his *contrasting* *epagôgê* and *sullogismos*, implies that such necessity is not an essential characteristic of *epagôgê*.

conclusion. Observe that this is, in the quote above, a description of *sullogismos* in contrast to *epagôgê*, and the quote does *not* describe *epagôgê* in this way.³³

VI. Aristotle's Evident Sense-Based Epistemology

It is thus very evident that Aristotle held the Difference Thesis. The evident fact that he held the Direction Thesis with regard to *epagôgê* combined with the evident fact that he held the Necessity Thesis with regard to *epagôgê* strongly suggests that he recognized some *epagôgê*—reasoning from the more particular to the more universal—where the lack of necessity in the inference is due to it being an *imperfect* inductive generalization. For in a *perfect* induction, the inference is indeed *necessary*. In Section VII below, I will cite some direct textual evidence strongly suggesting that Aristotle does indeed take *epagôgê*, at least sometimes, to be imperfect inductive generalization.

It is useful, however, to establish a certain context for understanding the textual evidence of the next section. This context is that Aristotle held an epistemology that is sense-based. That is, for the process of acquiring knowledge,³⁴ Aristotle evidently considered sense perception to be the foundation and starting point. Having this context will, in particular, be useful for understanding the quotations in the next section that seem to provide inductive

³³ See fn. 32.

³⁴ “Knowledge” here should be construed in the general sense, as against a specific kind of knowledge, such as *epistêmê* or *technê*.

generalizations from species (rather than from ultimate particulars). For, with this context in mind, there is a strong suggestion that such inductive generalizations from species are intended to be founded, at bottom on narrower inductive generalization, each about an *infimae* species, and that these, in turn, are founded on sense perception.

In this section, I will provide textual evidence to support the claim that Aristotle upholds a sense-based epistemology. Part of the evidence will be evidence that he rejects the doctrine that we have innate knowledge. Let us consider, first, the textual evidence that Aristotle rejected the doctrine that we have innate knowledge.

Evidence that Aristotle held the view of the mind as a “blank slate”—that it does not come with any knowledge at birth—can be found in *On the Soul*:

It is necessary then, since everything is (potentially) thought of, for thought to be unmixed, as Anaxagoras says, in order to rule, and this is to say, in order to know; for it is not hindered or obstructed by an appearance alien to it, within it: it follows that its nature is nothing other than this: a certain capacity. (*DA*, 429a18-21, trans. mine)

This passage suggests that we are not born with innate knowledge or beliefs. For in that case, it seems that the faculty he is discussing—to *noein* (“thought” or “intellect,” in contrast with sense perception)—would not have a nature that is *nothing other* than a certain capacity. In that case, it seems that part of its nature would also be to have some knowledge or beliefs at birth, and it would not be unmixed.

Further evidence that Aristotle does not consider humans to have any innate knowledge can be found in *APo.* B.19, which is evidently about how one acquires the “primitives” or “immediates” needed for a demonstration.³⁵ In regard to whether the states of knowledge of these immediates are derived from prior knowledge, or “possessed” (presumably at birth), he writes:

It is absurd to suppose that we possess such states; for then we should possess pieces of knowledge more exact than demonstration without its being noticed. (*APo.*, 99b28-30)

In *On the Soul*, we find more evidence of Aristotle’s rejection of the doctrine that we have innate knowledge, and some positive evidence of his sense-based epistemology. He begins Ch. III.8 with a discussion of how the intellect is potentially any object it can know, as perception is potentially any object that can be perceived. He then says, “This is also the reason why if one perceived nothing one would learn and understand [*xuneîê*] nothing...” (*DA*, 432a6-7)³⁶ While its connection to the claim that perception is potentially any object that can be perceived may be unclear, what this quote clearly suggests is that the acquisition of knowledge by the intellect depends on sense perception. This in turn also

³⁵ One interpretation of what the primitives and immediates are, is that they are the principles (*archai*) that are ultimate premises of demonstration, and are primitive and immediate since they are two terms positively related to each other without any terms between them (if they had terms between them, they would have to be deductively demonstrated through those intermediate terms, in which case they would not be principles).

³⁶ Aristotle, *De Anima (On the Soul)*, trans. Hugh Lawson-Tancred (Penguins Books: London, 1986). Unless otherwise noted, any further reference to a translation of *On the Soul* will be to this work.

implies that one cannot have knowledge before one is capable of sense perception, i.e. that knowledge cannot be innate.

Something similar is suggested by *APo.* A.18, namely, that understanding—*epistêmê*—cannot be obtained without sense perception:

It is clear too that if some perception is wanting, some understanding [*epistêmê*] must also be wanting—understanding which it is impossible to get if we learn either by induction [*epagôgêi*] or by demonstration, if demonstration depends on universals and induction on particulars, if it is impossible to study universals except through induction...and if it is impossible to make an induction without having perception (for particulars are grasped by perception). It is not possible to get understanding of these items—neither from universals without induction nor through induction without perception. (*APo.*, 81a37-b9)

We can make sense of what this passage is claiming if we take “these items” in the last sentence to refer to items, suggested at the beginning, of which one lacks understanding (*epistêmê*), and if we take “particulars” and “universals” to include, in their reference, particular and universal *propositions* respectively. With this in mind, it appears that the last sentence asserts the antecedent of the conditionals in the prior sentence, the antecedents that demonstration depends on induction and that induction depends on sense perception. As such, the passage claims sense perception as a necessary foundation of all knowledge in the sense of *epistêmê*.

This suggestion is confirmed in *APo.* B.19. Recall the quote above from that chapter at 99b28-30. It argues that the principles of demonstration (i.e. the principles behind *epistêmê*) are not innate. Aristotle later indicates that the states of knowledge of the principles come about through sense perception:

...the states in question neither inhere in us in a determinate form nor come about from other states which are more cognitive; rather, they come about from perception... (*APo.*, 100a10-2)

Indeed, the end of the genetic account in *APo.*, B.19 indicates that

“primitives” (“*prôta*”) are acquired through sense perception:

Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which perception instills universals. (*APo.*, 100b3-5)³⁷

Finally, consider the following passages from the *Metaphysics* that

indicate that science (*epistêmê*) and art (*technê*) come from sense perception:

By nature animals are born with the faculty of sensation [*aisthêsin*], and from sensation, memory is produced in some of them, though not in others. ...The animals other than man live by appearances and memories, but the human race also lives by art and reasonings [*logismois*]. And from memory experience [*empeiria*] is produced in men; for many memories of the same thing finally produce the capacity for a single experience. ...science and art come to men *through* experience... (*Met.*, 980a28-981a3)

VII. Further Evidence That Aristotle Recognizes Imperfect Induction

Bearing in mind Aristotle’s evident sense-based epistemology, we can now turn to considering some more direct textual evidence that Aristotle considers some *epagôgê* to be imperfect inductive generalization.

³⁷ Aristotle makes this statement earlier in *APo.* B.19 when establishing the topic of the chapter: “I have said earlier that you cannot understand anything through a demonstration unless you know the primitive immediate principles” (*APo.*, 99b20-3). This suggests that “primitives” in the quote above are intended to be the ultimate premises of demonstration, or the terms used in the ultimate premises.

An example of *epagôgê* as imperfect inductive generalization can be found in

Topics:

Now, what a deduction [*sullogismos*] is was explained earlier. [See the quotation from *Topics* 100a25-7 above.] Induction [*epagôgê*], however, is proceeding from particulars up to a universal. For instance, if the pilot who has knowledge is the best pilot, and so with a charioteer, then generally the person who has knowledge about anything is the best. (*Top.* I, 105a12-9)

To make sense of the example of *epagôgê* offered, it seems that it should be read as follows: if a pilot with knowledge of piloting is the best pilot and a charioteer with knowledge of driving chariots is the best charioteer, then any craftsperson who has knowledge in some craft is the best at performing that craft. It is hardly plausible that pilots and charioteers were the only types of craftspersons that Aristotle believed existed. Yet the conclusion—a universal conclusion apparently about craftspersons—is drawn from only two premises—one about pilots and one about charioteers.³⁸ I would thus conclude that this is evidently an example of *epagôgê* as imperfect inductive generalization.

One may object as follows. Aristotle names only two types of crafts persons (pilots and charioteers), and then apparently draws a conclusion about *all* craftspersons. He must have been aware that such would be a *bad* induction, a blatant hasty generalization. So, in this example of *epagôgê*, he must be

³⁸ One may, it seems, try to read the argument in another way. But it seems that one's reading (to be consistent with the text) must involve two premises that are particular in relation to the universal conclusion, and a conclusion whose subject term refers to a kind that is wider than the particular species mentioned in the premises. As a result, the reading, it seems, would have to be an imperfect inductive generalization.

mentioning pilots and charioteers alone as shorthand for mentioning many more sorts of crafts persons. Indeed, it may be shorthand for mentioning *all* the sorts of craftspersons he thought existed and were possible, thus making this example a shorthand for a *perfect* enumerative induction.

I think that two considerations make this objection a bad one. The first, as I have argued above, is that Aristotle seems to hold the Necessity Thesis. He seems to believe that in a *sullogismos*, the conclusion always follows of necessity from the premises, whereas he apparently does *not* believe that such is always the case in an *epagôgê*. In other words (contemporary words), a *sullogismos* for Aristotle must, by definition, be valid. But, evidently, in an *epagôgê*, for Aristotle the conclusion *need not* follow of necessity from the premises. If so, then, apparently, an *epagôgê* need not even be a good induction for it to still be an *epagôgê*. In other words, an argument need not be a good *epagôgê* in order for it to be “proceeding from particulars up to a universal” (his description, in the quotation, of *epagôgê* in contrast to *sullogismos*). And observe that the argument in the quote above is given as an example only of *epagôgê*, not necessarily of *good epagôgê*. Thus, objecting that one should not take the *epagôgê* in the passage above as an imperfect inductive generalization because taking it as such would make it a *bad epagôgê* is not a good objection.

Second, if Aristotle intended the argument in the quotation to be shorthand for a *perfect* induction, we should expect to see some indication of that in the

quotation. An indication would, for example, be a clause qualifying the list of the premises, like "...and these two are the only sorts of crafts persons..." or "...and these are all the sorts of crafts persons..." or "Assume that pilots and charioteers are the only crafts persons." However, there is no such indication in the quotation.

Two further examples of *epagôgê* as imperfect inductive generalization may be found in *Rhetoric* B.23. As Aristotle indicates at the beginning of this chapter, it discusses commonplace probative arguments.³⁹ He discusses various sorts of such commonplace arguments, and then turns to those based on *epagôgê*. He considers, as *epagôgê*, what appears to be an induction that all women everywhere can correctly settle the facts about their children:

Another line is based upon induction [*ex epagôgês*]. Thus from the case of the woman Peparethus it might be argued that women everywhere can correctly settle the facts about their children. Another example of this occurred at Athens in the case between the orator and his son Mantias, when the boy's mother revealed the true facts: and yet another at Thebes, in the case between Ismenias and Stilbon, when Dodonis proved that it was Ismenias who was the father of her son Thetteliscus, and he was in consequence always regarded as being so. (*Rhet.*, 1398a32-b4)⁴⁰

The structure of the presentation of the argument suggested in this passage seems to be as follows. First, a particular premise, and the (apparently universal)

³⁹ See *Rhet.*, 1397a6-7, 20-3. In the *Rhetoric*, Aristotle apparently considers a "probative argument" ("*deiktikos*") to be one that seeks to prove a claim. It is distinguished from raising an objection ("*enstasin enenkôn*"), (*Rhet.*, 1403a25-6).

⁴⁰ Aristotle does not give details about his reference to "the woman of Peparethus." Judging from this and from his other examples of women in this passage, she was likely a woman who was known by Aristotle's audience as one who had judged certain facts about her child (or children) correctly. As such, Aristotle's reference in this passage to her would be one of the particular premises he names as part of his apparent example of inducing a universal conclusion.

conclusion is presented. Then, reference is made to two additional particular cases, which could serve as two additional particular premises in support of the conclusion.

It seems that the conclusion of the suggested argument should be taken as a universal statement—as “all women who are mothers, everywhere, can correctly settle facts about their children,” or at least as having “most” for a quantifier—as “most women who are mothers, everywhere, can correctly settle facts about their children.” For if we take the conclusion as being quantified with “some”—as “some women everywhere can correctly settle facts about their children”—it would seem to be too close to being a truism for a rhetorician to have to explicitly *argue*.

And yet we should observe that this argument, which is of the commonplace and probative sort according to Aristotle, apparently reasons to the more universal conclusion from only *three* particular premises. Yet Aristotle could not plausibly have believed that the cases referred to by these three premises are *all* of the particular cases subsumed by the conclusion that all women everywhere can correctly settle facts about their children.⁴¹ Thus, this

⁴¹ And, in the case that Aristotle thinks the conclusion is quantified with “most,” he could not plausibly have believed that the cases referred to by these three premises are at least most of the particular cases subsumed by the conclusion that most women everywhere can correctly settle facts about their children.

argument is evidently another example of *epagôgê* as imperfect inductive generalization.

The following passage, from the same chapter, apparently offers another example of *epagôgê* as imperfect inductive generalization:

Another instance is the argument of Alcidimas: ‘Everyone honours the wise. Thus the Parians have honoured Archilochus, in spite of his bitter tongue; the Chians Homer, though he was not their countryman; the Mytilenaeans Sappho, though she was a woman; the Lacedaemonians actually made Chilon a member of the their senate, though they are the least literary of men; the inhabitants of Lampsacus gave public burial to Anaxagoras, through he was an alien, and honour him even to this day.’ (*Rhet.*, 1398b10-6)⁴²

Since this passage is from a larger passage discussing epagogic commonplace arguments (as indicated by the quote above this one), it is reasonable to take the argument offered as intended as an *epagôgê*. (Also, it has the structure one would expect of an *epagôgê*, given the Direction Thesis.)

The argument offers five particular premises and a universal conclusion. Yet it is hardly plausible to think that Aristotle or Alcidimas believed that the inhabitants of the five states mentioned in the premises are *all* the people subsumed by the conclusion that *everyone* honors the wise. (For example, what

⁴² The word “thus” in this passage—a translation of the Greek word “*goun*”—may make it appear that the references to the Parians, Chians, etc. are *deductions* from the universal claim that everyone honors the wise. Yet the context makes clear that this argument is intended to be an example of *epagôgê* (induction). For the phrase “[a]nother instance” means another instance of *epagôgê*, since this quoted passage is a continuation of the quoted passage at 1398a32-b4, and that passage introduces probative arguments that are epagogic. Further, “thus” is perhaps not the best translation of “*goun*,” which more literally means “at least.” See Liddell-Scott, 168. (*An Intermediate Greek-English Lexicon*, eds. Liddell, H.G., Scott (Oxford: Oxford University Press, 2002). Any further reference to Liddell-Scott will be to this work.)

about the Thebans? What about the Stagirans and other Macedonians?) Thus, the argument in this passage is evidently another example of *epagôgê* as an imperfect inductive generalization.

In addition to these passages, which evidently provide examples of *epagôgê* as imperfect inductive generalization, another sort of passage is noteworthy. This is the passage of the sort that evidently provides an example of *epagôgê* as *perfect* enumerative induction, which arguably tacitly presupposes and rests on one or more *imperfect* inductive generalization.

An example of such a passage can be found in the *Eudemian Ethics* II:

...excellence is the best state or condition or faculty of all things that have a use and work. This is clear by induction [*ek tês epagôgês*]; for in all cases we lay this down: e.g. a garment has an excellence, for it has a work and use, and the best state of the garment is its excellence. Similarly a vessel, house, or anything else has an excellence; therefore so also has the soul, for it has a work. (*EE*, 1218b38-1219a5)⁴³

The clause “for in *all* cases, we lay this down” (italics added) strongly suggests that what follows is supposed to be a *perfect* induction. What are the more particular premises? One is about garments, another is about vessels, and another is about houses. And a premise about “anything else” is added. Given Aristotle’s condition stated just earlier that things that have a use and a work have an excellence, it seems that the last premise is best read as being about “anything else that has a use and a work.” Aristotle seems to take all of these premises

⁴³ Aristotle, *Eudemian Ethics*, trans. J. Solomon in Aristotle, *The Complete Works of Aristotle Vol. II*, ed. Jonathan Barnes (Princeton: Princeton University Press, 1995), 1922-81. Unless otherwise noted, any further reference to a translation of *Eudemian Ethics* will be to this work.

together to produce the perfect induction that all excellence is the state (or condition or faculty) of something that has a use and a work. However, for Aristotle, coming to know these premises (and know their truth), as against merely assuming them, it seems, would require imperfect inductions. For example, it seems that one would have to induce that all excellence for houses is the best state or condition for a house. But it would be impossible to survey all houses that may be excellent that existed, exist presently, and will ever be built, so it would have to be an *imperfect* induction. The same, it seems, would hold for other artifacts, such as vessels. And, given that Aristotle holds the Direction and Necessity Theses, it is reasonable to think that he would consider such processes of imperfect inductive generalization as instances of *epagôgê*.

Another example in Aristotle's works of an *epagôgê* that appears to be, at bottom, an imperfect induction is in *On the Heavens* I.7:

...a place in which a thing rests or to which it moves unnaturally, must be the natural place for some other body, as induction [*epagôgê*] shows. (DC, 276a12-4)⁴⁴

According to Aristotle, a thing's natural motion or rest is motion or rest that it undergoes which comes from its own nature. Unnatural motion or rest is that which is a deviation from a thing's natural motion or rest, and (apparently) comes from the force exerted on it by another body. For example, the natural motion of

⁴⁴ Aristotle, *On the Heavens*, trans. J.L. Stock in Aristotle, *The Complete Works of Aristotle*, Volume I, ed. Jonathan Barnes (Princeton, NJ: Princeton University Press, 1995), 447-511.

fire for Aristotle is upwards; it is unnatural for fire to be in motion downwards, i.e. toward the center the earth.⁴⁵

The passage above provides more evidence that Aristotle recognizes *epagôgê*, at least sometimes, as imperfect inductive generalization. The conclusion—that “a place in which a thing rests or to which it moves unnaturally, must be the natural place for some other body” seems to be a universal conclusion, despite the fact that it is not explicitly quantified. It would require an unnatural reading of the passage to take Aristotle to tacitly hold the conclusion to be quantified with “some” (or even “most”) rather than “any.” For in such a case we would expect him to say that *epagôgê* reveals that the conclusion does not hold for some *other* places. And yet it is implausible to take Aristotle to believe that we induce the conclusion from observations of *all* such places, for the number of such places in the universe (even given Aristotle’s view of the universe as finite in size) would be virtually *countless*, much more than any person could be expected to perceive in the course of an entire lifetime.⁴⁶

⁴⁵ See *On the Heavens* I.8. See also *Physics* 205b24-31 where Aristotle mentions the “natural locomotion”—upwards for the light, towards the center of the earth for the heavy—of bodies, in the context of arguing against the possibility of an infinite sensible body. (Aristotle, *Physics*, trans. Gaye, R.K. and R. P. Hardie in Aristotle, *The Complete Works of Aristotle Vol. I*, ed. Jonathan Barnes (Princeton, NJ: Princeton University Press), 315-446. Unless otherwise noted, any further reference to a translation of the *Physics* will be to this work.) See also *Physics* 230b11-17 where Aristotle claims fire has a natural motion upwards and an unnatural motion downwards, and vice versa for earth. See also, generally, all of *Physics* IV where Aristotle discusses ‘place’ in connection with natural motion and rest.

⁴⁶ In *Physics* IV.4, Aristotle presents his argument that the place of a thing is “the innermost motionless boundary of what contains it” (*Phys.*, 212a20-1). For a small stone on the ground, its

One may object that Aristotle could be taking the induction of the conclusion to proceed from a complete premise set about *kinds* of places—with premises like “the ground has all the places to which things move unnaturally and is the natural place for other bodies,” “the air has all the places to which things move unnaturally and is a natural place for other bodies,” etc. One should observe that such general premises are by nature universal. To justify such a premise, we need to base it on an “incomplete” set premises, each about an ultimate particular. Or, at the very least, behind the narrowest universal generalizations leading to the conclusion in the block quote above, we need an “incomplete” set of premises, each about an ultimate particular. And it is reasonable to think that the processes of reasoning to these narrowest generalizations—processes which are *imperfect inductive generalizations*—would, for Aristotle, be processes of *epagôgê*. For Aristotle holds the Direction Thesis. This, in regard to *epagôgê*, is that *epagôgê* consists in reasoning from particular premises to a universal conclusion.⁴⁷

I will now offer a more general argument that Aristotle considers at least some *epagôgai* to be imperfect inductive generalizations. The universal truths reached by *epagôgê* cannot all be by *epagôgê* as *perfect* induction, but at least

“place” would be the boundary of the containing body—the ground and the air—touching (“in contact with”) the stone’s surface. Given such a view of place, it should be obvious that there are virtually countless (arguably, a potentially infinite number of) places in the world.

⁴⁷ In the passage above is evidence, Aristotle appears to reason from *more* particular premises to a *more* universal conclusion, since it seems that the premises are not directly about *ultimate* particulars. Hence, the passage is evidence that when Aristotle writes that *epagôgê* consists in proceeding from the particular to the universal, he means: from the *more* particular to the *more* universal. This is what the Direction Thesis should be understood as claiming.

some (indeed, it seems, a significant number) must be by *epagôgê* as *imperfect* inductive generalization. For not all (indeed, it seems very few) natural species that Aristotle seems to recognize could seem to be the subject of universal truths reached through *perfect* induction, i.e. through a survey of *all* members of the species. For Aristotle evidently considers species of earthly living things, such as horses, to have a potentially infinite number of specimens.^{48, 49} This, in turn, strongly suggests that for Aristotle many species of man-made objects, such as houses, would have a *potentially* infinite, or at least a potentially very large, number of specimens. For if there are potentially infinite number of humans, there is a strong suggestion that the number of individual human artifacts—especially

⁴⁸ Aristotle's view of infinity, as expressed in *Physics* III.6, is that it is a potentiality and never an actuality. A magnitude can have a *potentially* infinite number of parts, which is to say that it can be divided into smaller and smaller parts indefinitely, without end. But at any point in the dividing, the *actual* number of parts will be finite. Similarly, a quantity of beings can be *potentially* infinite, which is to say that it can be indefinitely added to, without end. But at any point in the adding, the *actual* number of beings will be finite. Thus, to say that for Aristotle there may be infinitely many horses would be to say that horses (through reproduction) may be added indefinitely, without end.

⁴⁹ One piece of evidence that Aristotle considers the human species to have a potentially infinite number of specimens is found in the *Physics*: "The infinite exhibits itself in different ways—in time, in generations of men, and in the division of magnitudes" (*Phys.*, 206a25-7). Stronger evidence that Aristotle considers the number of specimens of a species of earthly living things to be potentially infinite is found at *GA*, 731b33-a1: "...that which comes into being is eternal in the only way possible. Now it is impossible for it to be eternal as an individual...but it is possible for it as a species. This is why there is always a class of men and animals and plants." (Aristotle, *Generation of Animals*, trans. A. Platt in Aristotle, *The Complete Works of Aristotle Vol. I*, ed. Jonathan Barnes (Princeton, NJ: Princeton University Press, 1995), 1111-218.) This should be understood in connection with the claim of *Categories* at 2a34-b6 that without "primary substances" (individual objects such as individual horses or individual houses), nothing else—and, in particular no species or genus—would exist. As such, the statement from *Generation of Animals* implies that the number of specimens of species of plants and animals is potentially infinite.

those used for survival (e.g., individual axes, individual houses)—is also potentially infinite.⁵⁰

Further, Aristotle clearly did not think that a mind could traverse infinitely many items. Consider *APo.* A.3. In considering the alternative of an infinite chain of demonstrations (in contrast to circular demonstrations, etc.), Aristotle says, “...it is impossible to survey infinitely many items” (*APo.*, 72b11). Surely, such a statement would apply to an induction from infinitely many particular facts. Though he is specifically discussing a chain of demonstrations, there is no reason to think that “*apeira*”—the infinite series or “infinitely many items”—would apply *only* to a sequence of demonstrations. If for Aristotle, it is impossible for the mind to survey infinitely many demonstrations, then there is no reason for us to think that he believed that the mind *can* survey infinitely many particular facts before making an inductive generalization.⁵¹

Accordingly, it appears that for Aristotle, knowledge about any species with a potentially *infinite* number of members would have to rely (at bottom) on imperfect inductive generalization. Since, he calls reasoning from particular facts to a universal claim “*epagôgê*,” he would consider such imperfect inductive

⁵⁰ Even if Aristotle would not have considered any type of man-made object (such as houses) to be a natural kind but an artificial one, the same analysis would apply. Apparently, there would potentially be an infinite number of houses (for example), and the mind could not possibly complete a survey of an infinite number of them.

⁵¹ On the basis of common sense, it seems that Aristotle is correct; it seems absurd to think that a human mind could actually complete a survey of an infinite number of things.

generalizations as constituting at least one type of *epagôgê*. For example, what appears to be intended as a perfect induction in *Prior Analytics* B.23 that all long-lived things are bile-less, would seem to rest on *epagôgê* in regard to the species: from observations of particular horses, we conclude that all horses are long-lived and bile-less; from observations of particular humans, we conclude that all humans are long-lived and bile-less, etc. But Aristotle must have been convinced that there are *potentially* infinitely many horses. If he considered all *epagôgê* to be perfect enumerative induction, we would have to, it seems, ascribe to him the claim that to know that all horses are bile-less and long-lived, we would have survey infinitely many horses (which would take an eternity). It is implausible to ascribe the latter alternative to him. Ascribing the former alternative to him is not only implausible, but, as we have seen, Aristotle thinks it is impossible for the mind to survey infinitely many items. Surely then, for Aristotle, arriving at the knowledge that all horses are bile-less and long-lived would require that we survey multiple (perhaps many), but not an infinite number of horses, not all the horses that ever lived, live now, and will live.⁵²

⁵² Thomas V. Upton makes the general point I am making here in Thomas V. Upton, "Infinity and Perfect Induction in Aristotle," *Proceedings of the Catholic Philosophic Association*, Vol. 55 (1981), 149-58. Any further reference to Upton (1981) will be to this article.

That is, for Aristotle, reaching that knowledge would seem to require an *epagôgê* which is an *imperfect inductive generalization*.⁵³ And similarly, knowledge about other species with a potentially infinite number of members, such as (presumably) axes and rabbits, would seem to require, at some point, *epagôgê* as imperfect inductive generalization from a subset of the particular specimens in question.

My last point in connection with this general argument concerns my claim from Section I that for Aristotle, the conclusions of some inductive generalizations *might* be quantified with “most” rather than with a universal quantifier. We should note that where such inductive generalizations are about species with a potentially infinite number of specimens, it would be implausible to think that Aristotle would require *most* of the specimens to be surveyed before the generalization is made.⁵⁴ Even in cases where Aristotle might seek to reach an inductive generalization, quantified with “most,” about a species with a

⁵³ In connection with the evidence I have so far given that Aristotle must at least sometimes consider *epagôgê* to be imperfect inductive generalization, consider the following. Taking Aristotle to consider *epagôgê* to *always* be perfect induction would be uncharitable. For then *all* of what he considers to be demonstrations would inherently beg the question. For the conclusion of such a putative demonstration would have to be part of one of the premises of the *epagôgê* used to reach the one of the first premises of the putative demonstration. Thus, consider this argument, offered as a demonstration in *APo.*, 78b9-11: all of what is spherical waxes in this way; the moon is spherical; so, the moon waxes in this way. If *epagôgê* is always perfect induction, the claim that the moon is spherical and waxes in this way would have to be one of the premises in the *epagôgê* used to justify the premise (of the deduction) that all of what is spherical waxes in this way.

⁵⁴ Indeed, if the number of specimens in a given species is *potentially infinite*, it seems impossible ever to survey “most” of the specimens, since, at any point in the survey, *potentially* there will, in the future, be more than the twice the number of specimens surveyed so far.

potentially infinite number of specimens, it is plausible only to take him as requiring that a number of specimens less than that of most of the specimens be surveyed. That is, it is plausible only to take him as requiring an *imperfect* inductive generalization.

Despite all of the above evidence that Aristotle does sometimes recognize *epagôgê* as imperfect inductive generalization, a certain chapter in *Prior Analytics* might raise some doubts on this issue. There is a remark in *APr.* B.23 that suggests that for Aristotle *epagôgê* is *always* perfect enumerative induction. I will consider next whether we should take that to mean that Aristotle was indeed committed to the position that *epagôgê* is always *perfect* induction.

VIII. “*Epagôgê*” in *Prior Analytics* B.23

As I have already mentioned, Aristotle in *Prior Analytics* B.23 presents what he calls an “*epagôgê*” (and which he apparently takes to be synonymous with “*sullogismos ex epagôgês*”—“deduction from induction”⁵⁵) that seems to be a perfect enumerative induction (that all long-lived things are bile-less). Aristotle makes the following assumptions. Let A, standing for the property long-lived, belong to the whole of C, standing for particular species of long-lived things. Let

⁵⁵ The Greek in *APr.* B.23 at 68b15 is “*Epagôgê men oun ...kai ho ex epagôgês sullogismos...*” Smith translates this as “Induction, then—that is, a deduction from induction—...” (*Prior Analytics*, 68b15), suggesting that “*epagôgê*” here is considered by Aristotle to be synonymous with “*sullogismos ex epagôgês*.” This reading has been contested by some commentators. I will consider two of these commentators in Ch. 6.

B, standing for bile-less, belong to every C (a belonging of which we would know by an enumeration of each C). Let B and C convert, so that bile-less belongs to all and only long-lived things. Aristotle concludes from these that it is necessary that A belongs to B (that all of what is bile-less is long-lived). After laying out the above assumptions, to explain his drawing the conclusion that it is necessary that A belongs to B, Aristotle writes:

...for it has been proved earlier [at *APr.*, 68a16-22] that if two terms belong to the same thing and the extreme converts with one of them, then the other one of the predicates will also belong to the term that converts with it. (But one must understand C as composed of every one of the particulars: for *induction [epagôgê] is through them all.*), (*APr.*, 68b25-9, emphasis added)

This passage, and in particular, its italicized ending, suggests that the way one is to know that B (bile-less) belongs to all C, i.e. to all particular species of long-lived things, is to perform a *complete enumeration* of all particular species of long-lived things (i.e. of each C), and recognize of each that it is bile-less (i.e. is a subject of B). Thus, Aristotle's example of a "*sullogismos ex epagôgês*" is apparently a *perfect induction*.

With Aristotle apparently using "*sullogismos ex epagôgês*" above that passage as a synonym for "*epagôgê*," that passage, and the italicized part in particular, suggests that he regards *epagôgê* (*all epagôgê*) as *perfect induction*.

Near the end of *Prior Analytics* B.24 (the very next chapter), Aristotle makes a remark that seems to corroborate this. He contrasts *epagôgê* with *paradeigma*:

...[example, i.e. *paradeigma*] differs from induction [*tês epagôgês*] in that induction proves the extreme to belong to the middle term *from all the individuals*...while example...does not prove from them all. (*APr.*, 69a16-9, emphasis added)

The italicized part, in particular, seems to corroborate the view that Aristotle regarded all *epagôgê* as *perfect* induction.

Obviously, the suggestion that Aristotle regarded all *epagôgê* as *perfect* induction contradicts what I have argued in Sections V and VII above, that Aristotle regarded at least some *epagôgê* as *imperfect* inductive generalization. How should we resolve this dilemma? Did Aristotle regard all *epagôgê* as perfect induction or not?

One may try to offer any of three different answers to this question. (1) Aristotle consistently held that all *epagôgê* is perfect induction (in accordance with the suggestion of *Prior Analytics* B.23). (2) Aristotle, in some works (such as *Prior Analytics*) held that *epagôgê* is perfect induction, but in other works held that some *epagôgê* is imperfect induction, apparently modifying his position or changing his mind. (3) The reading of *Prior Analytics* B.23 suggested above is incorrect; in that chapter, Aristotle does *not regard all epagôgê* as perfect induction.⁵⁶ Option (1) does not appear to be viable, given all of the evidence I

⁵⁶ Some commentators have taken this position. I will discuss certain of them in Ch. 3 and Ch. 4. As will be seen, my interest in discussing them is that, in one form or another, they claim that Aristotle did not think *epagôgê* could establish the certain truth of a principle or that he considers *epagôgê* to be non-inferential—both of which I reject.

have offered in Sections V and VII above that Aristotle did consider *some* *epagôgê* to be *imperfect* inductive generalization.

This leaves us with Option (2) and Option (3). It may be difficult to decide between them. But what is significant to my thesis in this work is that either of those two options is consistent with my position that Aristotle did deal with a problem of induction.⁵⁷ If we assume the “developmentalist” view of Option (2), then Aristotle modified (or changed his mind outright about), some time after (or before) writing *Prior Analytics* B.23, his view of whether all *epagôgê* is perfect induction. If so, then my position seems consistent with Aristotle’s view of whether all *epagôgê* is perfect induction, at least (evidently) for the greater part of his career. If we assume Option (3), that reading *Prior Analytics* B.23 as regarding all *epagôgê* as perfect induction is wrong, then our assumption, as such, does not contradict my position Aristotle dealt with a problem of induction.

IX. Conclusion

Aristotle regards *epagôgê* as a species of reasoning that consists of moving from the particular to the universal. Further, in contrast to *sullogismos*, Aristotle apparently does not consider the conclusion following of necessity to be essential to *epagôgê*. The two theses (the Direction Thesis and the Necessity

⁵⁷ My position is that Aristotle dealt with the problem of induction. I think it is fairly obvious that if Aristotle held, throughout his career, that all induction is perfect induction, then he was committed to the view, throughout his career, that there is no such problem.

Thesis respectively) suggest that Aristotle does regard some *epagôgê* as imperfect inductive generalization. Additionally, some direct textual evidence shows that he does regard some *epagôgê* to be imperfect inductive generalization.⁵⁸ This is further shown by the fact that Aristotle regarded the number of specimens of some species (namely, those of earthly living things) to be potentially infinite. This combined with the fact that Aristotle did not think that the mind can traverse an infinite series implies that *epagôgai* that are generalizations about such species would, at bottom, be imperfect inductive generalizations.

APr. B.23 is sometimes read as claiming that Aristotle considered all *epagôgê* to be perfect induction. But the view that Aristotle consistently and throughout all his works holds this view of *epagôgê* is untenable, given the enormous amount of evidence to the contrary. It is more reasonable to adopt the position that *APr. B. 23* does not claim that *all epagôgê* is perfect induction, or that the chapter does claim that but that Aristotle changed his mind when writing other material.⁵⁹

The evident fact that Aristotle considers some *epagôgê* to be imperfect inductive generalization will help support my reading of the genetic account of

⁵⁸ Aristotle's regarding some *epagôgê* as imperfect inductive generalization implies that he considered some *epagôgê* as moving from *propositions* to a *proposition* (as against from objects to a universal term).

⁵⁹ Aristotle's examples of *epagôgê* that consist of moving from premises about species (as against ultimate particulars) to a more universal conclusion—including the example in *APr. B.23*—strongly suggest that in his description of *epagôgê* as reasoning from the particular to the universal, he means from the *more* particular to the *more* universal.

APo. B.19. But before I offer and defend my reading of the genetic account, I will criticize certain readings of it that are uncommon and opposed to my own in certain fundamental respects.

Chapter 2: A Response to Hamlyn

I. Introduction

Up to this point, I have provided strong evidence that Aristotle does consider some *epagôgai* to be imperfect inductive generalizations. Before I turn to the task of providing and defending my reading of the genetic account of *APo.* B.19, where I indicate that the *epagôgê* mentioned in that chapter (usually) involves an imperfect inductive generalization, I will consider and criticize certain readings of the genetic account that conflict with my own and which merit treatment prior to the presentation of my reading of the genetic account. In this chapter, I will focus on D.W. Hamlyn's reading of this account in "Aristotelian Epagoge."¹

My reason for considering Hamlyn in a separate chapter before I present and defend my reading of the genetic account is as follows. After presenting much of his genetic account in *APo.* B.19 of how we come to know the principles of demonstration, Aristotle makes the following statement:

[A]

It is clear then that we must recognize the first (principles) by induction (*epagoge*); for sense perception introduces the universal in this way. (*APo.*, 100b3-5, trans. Hamlyn in Hamlyn, 171)

¹ "Aristotelian Epagoge," *Phronêsis* Vol. 21 (1976), 167-84. Any further reference to a work by Hamlyn will be to this article.

Most commentators take the *epagôgê* mentioned in Passage A to refer to the process described just prior to Passage A, at *APo.*, 100a35-b3. This process appears to be one of grasping universals from sense perception.² This common reading is an important part of the basis of many commentators for taking the *epagôgê* mentioned in this passage as a process of discovery consisting of generalizing from observed instances (i.e., as what Hamlyn calls “ampliative induction” (Hamlyn, 168)). As will be seen in Ch. 4, I agree with that common reading, and I agree that the *epagôgê* mentioned in this passage is ampliative induction. Further, as will be seen in Ch. 4, my position that the *epagôgê* is ampliative induction is part of my integrated reading of the genetic account according to which such ampliative induction is often imperfect inductive generalization. Hamlyn, however, takes the *epagôgê* mentioned in this passage as a dialectical argument (rather than as ampliative induction) employed in a teacher-student context. So, clearly, Hamlyn’s reading of the genetic account conflicts with my own. Before presenting my own reading of the genetic account in Ch. 4, it is helpful to “clear away” certain uncommon readings of that account, including that of Hamlyn. Since Hamlyn presents a complex set of items of

² Commentators disagree whether the grasp is merely of universal *concepts* or also of universal *propositions*, but many consider it to be also of universal propositions. Examples of commentators who agree with this common reading are Barnes in Barnes (2002), 259-67 and Robert Bolton in Bolton, 5-11. (The work is: Robert Bolton, “Aristotle’s Method in Natural Science: *Physics* I” in Lindsay Judson, ed., *Aristotle’s Physics* (New York, NY: Oxford University Press, 1991), 1-29. Unless otherwise noted, any further reference to a work by Bolton will be to this work.)

evidence in support of his position, it is helpful to devote a chapter to Hamlyn's position.

II. Hamlyn's Position and Supporting Evidence

Hamlyn's position, again, is that the *epagôgê* mentioned in *APo.* B.19 at 100b4 is not a process of discovery. It is a dialectical argument employed in a teacher-student context. The genetic account prior to 100b4, Hamlyn thinks, describes a process in which a student acquires perceptual experience, and from this, a universal concept. Hamlyn thinks that the *epagôgê* mentioned at 100b4 presupposes that the student has undergone such a process. Why? Because for the teacher to employ an *epagôgê* to get the student to see the truth of a principle, the student must be capable of recognizing the particulars as particulars subsumed by the universal concept (Hamlyn, 182). If, for example, a teacher seeks to use an epagogic dialectical argument to get a student to see the truth of the principle that all men reason, the student must already have acquired the concept man from sense experience, and be capable of recognizing particular men (such as Callias and Socrates) as men.

Once a student has the required perceptual experience and concepts, a teacher, together with the student, will employ *epagôgê* as an application of a general principle to particular cases in the student's experience. Assuming the teacher seeks to get the student to see the truth of the principle, for example, that

all men reason, such a dialectical process would presumably proceed as follows.³ The teacher would ask the student if Callias is a man and if he reasons. If the student sees the truth of affirmative responses, the student would respond affirmatively to both questions. The teacher would then ask the student if Socrates is a man and if he reasons. Again, if the student sees the truth of affirmative responses, the student would again respond affirmatively to both questions. In each question-and-answer round in which the student responds affirmatively, the general principle has been applied to a particular case. After a series of such questions and affirmative responses, the student will be brought to “see” the truth of the principle (in this case the principle that all men reason), (Hamlyn, 181-4).⁴

Turning now to the evidence that Hamlyn offers for his position, it seems that there are four main items of evidence. Hamlyn offers additional, corroborating evidence which is relevant mainly to the third and fourth main item of evidence.⁵ In connection with this corroborating evidence, Hamlyn offers readings of three passages to make them consistent with the view that *epagôgê* for Aristotle is dialectical argument.

³ I say “presumably” here because Hamlyn does not give a concrete example of the process, but describes a process for which the example I give appears to be appropriate.

⁴ Hamlyn takes “see” in this context to mean to be directly aware of, which includes, but is not limited to, literal sight. This direct insight is what he thinks *nous* (or “comprehension” in Barnes’ translation), discussed at *APo.*, 100b5-17, is intended to be (Hamlyn, 171).

⁵ The following ordering of the evidence is mine and not Hamlyn’s.

The first of the main pieces of evidence is based on Hamlyn's claim that the genetic account in *APo.* B.19 *before the passage mentioning of epagôgê at 100b4*⁶ is not a plausible account of how we obtain knowledge of principles (*archai*), (Hamlyn, 179-80). In particular, the claim (at 100b5-17), connected with the genetic account, that one knows the principles by *nous* (often translated as "intuition") would scarcely satisfy the skeptic (Hamlyn, 172, 181). Thus, it is implausible to take the account as a prescription for the justification of knowledge claims of principles (Hamlyn, 181). Hence, taking the account as a description of the *epagôgê* mentioned at 100b4, so that the *epagôgê* is a process of inductive discovery and justification, is not plausible (Hamlyn, 181-2). It is more plausible to take it as intending "to provide a framework of genetic epistemology in terms of which *epagoge* [as a dialectical argument] can be given a sense" (Hamlyn, 182). A learner of principles must have the relevant perceptual experience and concepts stored in memory before a teacher can provide an *epagôgê* (as a dialectical argument) to get the learner to see the meaning and truth of a principle. The genetic account prior to 100b4 should be taken merely as an account of how we acquire such perceptual experience and concepts, of the capacities and states

⁶ Hamlyn's claim in Hamlyn, 171-2 and 181-2 that "*epagôgêi*" at *APo.*, 100b4 should not be taken as referring "back" to the genetic account, suggests that Hamlyn thinks the genetic account *ends* before the sentence containing "*epagôgêi*," i.e., that he thinks it ends at 100b3.

we as humans must have if we are to learn the truth of a principle from a teacher using *epagôgê* (as a dialectical argument), (Hamlyn, 182-4).⁷

Related to that is the second main piece of evidence. It consists of a reading of part of the genetic account. Here is a quote of the relevant part of *APo.* B.19, the part that begins with a restatement of the part of the genetic account just prior to it:

[B]

Let us say again what we have just said but not said clearly. When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; for although the particular is perceived, the perception is of the universal,—e.g. of man, not of Callias the man. Next, a stand is made among these items, until something partless and universal makes a stand. E.g. such-and-such an animal makes a stand, until animal does; and with animal a stand is made in the same way. Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which perception instills the universal. (*APo.*, 100a14-b5, trans. Barnes modified⁸)⁹

Consider this clause in the passage: “...for although the particular is perceived, the perception is of the universal,—e.g. of man, not of Callias the man.” Hamlyn

⁷ As neither the single statement in *APo.*, B.19 (beginning at 100b3) explicitly mentioning *epagôgê*, nor any other part of B.19, *explains* how a teacher should employ *epagôgê* to get a student to see the truth of a principle, Hamlyn thinks that this is explained elsewhere in Aristotle’s works (especially the *Topics*, which explicitly deals with dialectic), (Hamlyn, 168-9). This helps Hamlyn to complete his case that the genetic account before 100b4, and indeed the entirety of *APo.*, B.19, is about something *other* than the justification of knowledge claims.

⁸ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” Further “universal” in the last sentence replaces Barnes’ “universals.” This is done to make the translation more closely reflect the Greek.

⁹ Passage A above is a part of (the end of) Passage B, but is in a different (i.e., Hamlyn’s) translation.

reads this as saying that a particular must be perceived *as* something, as a member of a kind. Callias, for example, must be perceived as a man. Hence, the sense perception of a particular is enough to implant the universal (or one of the universals) it instantiates into the perceiver's mind (Hamlyn, 181). This, Hamlyn thinks, rules out the *epagôgê* mentioned at 100b4 from being a process of discovery. For, on that view of the *epagôgê*, it would be a process of discovering a universal truth (or concept) from perceptual experience. But, Hamlyn argues, on Aristotle's own account, one grasps a universal by the sense perception of a particular instance of it before going through an *epagôgê* as a process of discovery based on sense perception (Hamlyn, 181). Thus, "in this way" (or "this is the way in which" in Barnes' translation) at 100b5 must be taken as referring back to the genetic account prior to 100b4, rather than to "*epagôgêi*" at 100b4. The genetic account prior to 100b4, in other words, cannot be taken as a description of the *epagôgê* mentioned at 100b4—which disqualifies the genetic account prior to 100b4 as evidence that the *epagôgê* is a process of discovery (Hamlyn, 181).

The third of the fourth main pieces of evidence offered by Hamlyn that "*epagôgê*" in *APo.* B.19 is a dialectical argument is the fact that Aristotle credits Socrates for discovering *epagôgê* (Hamlyn, 168).¹⁰ Aristotle cannot, Hamlyn thinks, have in mind a process of abstracting a generalization from particular

¹⁰ Hamlyn's reference to Aristotle is to *Met.*, 1078b28.

cases (i.e. a process of “ampliative induction”). For that is not what Socrates does when employing *epagôgê* (Hamlyn, 168). What Socrates does when employing an *epagôgê*, and what Aristotle must mean by “*egagoge*,” is give a dialectical argument that consists of citing particular cases of a general principle to get an interlocutor to see the truth of the principle (Hamlyn, 168).

The fourth main piece of evidence offered by Hamlyn is that *APo.* B.19 seems to refer back to A.1, and A.1 indicates that both deductive and inductive (epagogic) arguments are parts of a teaching and learning context (Hamlyn, 178). *APo.* A.1, opens with the claim that all teaching and learning “of an intellectual kind” depend on pre-existing knowledge (*APo.*, 71a1-2). It claims that arguments, both deductive and epagogic, also affect their teaching on the basis of pre-existing knowledge (*APo.*, 71a5-11). *APo.* B.19 seems to ask how we can have knowledge of principles if we do not “possess them” (i.e. if they are not innate), except from pre-existing knowledge (*APo.*, 99b28-9). This seems to reiterate the idea just mentioned from A.1 that all intellectual teaching and learning is based on pre-existing knowledge. This suggests that demonstration for Aristotle is part of a teaching and learning context. Moreover, it suggests that what Aristotle regards as somehow the base of demonstration, namely *epagôgê*, is part of a teaching and learning (teacher-student) context (Hamlyn, 173). It is difficult to conceive of ampliative induction—induction as discovery of a general truth from observations of particular instances—as being part of such a context. But it is not difficult to

conceive of a dialectical argument, in which particular cases are cited to persuade an interlocutor of the truth of a general principle, as being part of such a context. Hence, the apparent reference in *APo.* B.19 back to A.1, and the indication in A.1 that both deductive and epagogic arguments are part of a teaching and learning context suggests that the *epagôgê* mentioned in *APo.* B.19 is a dialectical argument and not ampliative induction.

In connection with the last two main pieces of evidence, Hamlyn offers an important piece of corroborating evidence, and in addition gives us a reading of three passages in Aristotle's works that makes them consistent with his position. The piece of corroborating evidence is that both the *Prior* and *Posterior Analytics* refer to Plato's *Meno*. Hamlyn takes the *Meno* to involve *epagôgê* as a dialectical argument consisting of the application of a general principle to one or more cases.

The reference in the *Prior Analytics* is in Ch. B.21 at 67a21-2 where Aristotle mentions the argument in the *Meno* that "learning is being reminded" (*APr.*, 67a21-2). Immediately afterwards, Aristotle turns to criticize this position, i.e., the doctrine of recollection in the *Meno*. Hamlyn translates the critical passage:

It never happens that we know the particular previously, but we get knowledge of the instances (*tên tôn kata meros epistêmên*) along with *epagôgê*, recognizing them as it were. For we know some things immediately, e.g., when we see that it is a triangle, that its angles are equal to two right angles. And similarly in the other cases. (*APr.*, 67a22-5, trans. Hamlyn in Hamlyn, 170)

Hamlyn takes this passage to use “*epagôgê*” to refer to the application of a general principle—that a triangle has angles equal to two right angles—to a particular triangle (Hamlyn, 170). And he considers it unsurprising, since he thinks Socrates in the *Meno* employs *epagôgê* as an application general principle to a particular case (Hamlyn, 171). Hamlyn’s point with regard to this passage (and the following passage, from *APo.* A.1, that pertains to the *Meno*) is that if *epagôgê* is a process of inductive discovery, it can hardly consist of applying a general principle to cases—but if *epagôgê* as a dialectical argument, it can. Hence, there is the suggestion here that the *epagôgê* mentioned in *APo.* B.19 is intended to be a dialectical argument, and not ampliative induction (Hamlyn, 169-70).

Hamlyn also notes that Aristotle explicitly refers to the problem in *Meno* in *APo.* A.1 at 71a29-30. Just before his explicit mention of the *Meno*, Aristotle asks:

If you did not know that there was such-and-such a thing *simpliciter*, how could you have known that it had two right angles *simpliciter*? (*APo.*, 71a26-8)

Apparently given his examples after this passage, Aristotle has the following question in mind (which he apparently takes as the same as or variation of the problem in the *Meno*¹¹). If you know that all things of a certain kind have a

¹¹ The problem of the *Meno*, put in the form of a dilemma, can be expressed as follows. In seeking the knowledge X, either one does not know X, in which case one does not know what one is looking for (so that acquiring the knowledge is impossible), or one already knows X, in which

certain predicate, *simpliciter*, and if you have *not* recognized a given particular of that kind as being of that kind, then how can you know *simpliciter* that the predicate belongs to that particular? Aristotle's answer, evidently, is that you cannot know it *simpliciter*, but only generally. According to Hamlyn's reading of this passage, Aristotle gives two examples of this answer. The first is that one may know that all triangles have angles equal to two right angles. But if one does not know of *this* (i.e. a particular triangle) as a triangle, one does not know *simpliciter* but only *generally* that it has angles equal to two right angles (Hamlyn, 173-4).¹²

The second example is that one may know that all "pairs" (apparently, a "pair" here is a sum of an integer and itself) are even. But if one does not know of a particular "pair" as a "pair," one does not know *simpliciter* but only generally that it is even (Hamlyn, 174).¹³

One comes to know *simpliciter* of *this* (i.e., a particular triangle) that it is a triangle with angles equal to two right angles by *applying* to it the general principle about triangles. Similarly, one comes to know *simpliciter* of *this* (i.e. a particular "pair") that it is a "pair" that is even by *applying* to it the general principle about "pairs." As with what Hamlyn thinks Socrates does in the *Meno*,

case one does not need to seek that knowledge. The dilemma implies that either knowledge cannot be acquired or that it need not be acquired. See Plato, *Meno*, esp. 80d3-87c8.

¹² The reference to the *Posterior Analytics* is to 71a27-30, 71b1-6.

¹³ The reference to the *Posterior Analytics* is to 71a32-b6.

Hamlyn considers Aristotle here to use “*epagôgê*” as an application of a general principle to a particular case.¹⁴ Hamlyn considers it “unfortunate” that Aristotle here confines his attention to “one kind of learning situation—that in which the learner, given a knowledge of a general principle, learns that a particular is an instance of it...” (Hamlyn, 173-5) Not all learning situations for Aristotle are of this kind (Hamlyn, 174).¹⁵

Recall the connection that *APo.* B.19 seems to have with A.1. Recall also the question from (or based on) the *Meno* that Aristotle seems to raise and try to answer in A.1. According to Hamlyn, Aristotle seems to have the problem of the *Meno* in mind in *APo.* B.19, which (given that *Meno* involves *epagôgê* as a dialectical argument) suggests, again, that the *epagôgê* mentioned in B.19 is a dialectical argument (Hamlyn, 174).¹⁶

In connection with the above corroborating evidence, Hamlyn reads three passages in a way that makes them consistent with the view that *epagôgê* for

¹⁴ Apparently, part of Hamlyn’s evidence for this is that *APo.* A.1 states: “Before you are led to [*epachthênai*] the conclusion, i.e. before you are given a deduction, you should perhaps be said to understand it in one way, but in another way not” (*APo.*, 71a25-7). “*Epachthênai*” is a derivative of the root of “*epagôgê*,” and “*epagôgê*” literally means “a leading to.”

¹⁵ Since, according to Hamlyn, the function of the *epagôgê* in *APo.* B.19 is to get a student to see the truth of a principle of demonstration, Hamlyn is apparently making this statement to negate the suggestion that the *epagôgê* in *APo.* B.19 is one that instead has a function by which “the learner, given a knowledge of a general principle, learns that a particular is an instance of it...” (Hamlyn, 173-5)

¹⁶ The reference to the *Posterior Analytics* is to 99b27-35, where, with regard to knowledge of the principles, Aristotle seems to consider and reject the claim of the *Meno* that states of knowledge are innate and then considers the alternative that the states of knowledge of the principles are based on prior knowledge.

Aristotle (and in particular the *epagôgê* mentioned in *APo.* B.19) is a dialectical argument.

The first of these passages is at *APo.*, 81b5ff. Aristotle says there that one cannot have *epistêmê* of particulars,

...for neither can one get to them from universals (*sc.* universal propositions) without *epagoge*, nor can one get to them through *epagoge* without sense-perception. (*APo.*, 81b6-9, trans. Hamlyn in Hamlyn, 169-70)

Hamlyn acknowledges that this passage may be taken to suggest that Aristotle has *epagôgê* as ampliative induction in mind (Hamlyn, 169-70). But, Hamlyn continues, “the passage does not *say* that one gets the knowledge of universals as the result of a process which starts with the facts of sense perception” (Hamlyn, 170, emphasis in original). According to Hamlyn, the passage says that “the application of general principles to particular cases presupposes *epagôgê* and that the application of *epagôgê* itself presupposes sense perception” (Hamlyn, 170). And *epagôgê* as a dialectical argument, but not as a process of discovery, can involve the application of general principles to particular cases (Hamlyn, 170).

The second passage is found in *APo.* A.13 and pertains to reaching the “truth” that all of what is non-twinkling is near. Hamlyn writes of this passage:

Post. An. 78a34 says that the truth that that which does not twinkle is near must be taken, in the context of the argument given by way of example, to be grasped ‘through induction or through sense perception.’ (Hamlyn, 169)

Hamlyn adds that “[w]hether the ‘or’ is an ‘i.e.’ or whether it expresses a genuine alternative,”¹⁷ the passage cannot be taken as guaranteeing that *epagôgê* is ampliative induction (Hamlyn, 169). For even if *epagôgê* is a dialectical argument, it can surely still make use of facts of sense perception (Hamlyn, 169).

The third passage is in the *Nicomachean Ethics* at 1139b28. The passage says (or suggests) that *epagôgê* is the *archê* (principle, starting point, or origin) of *to katholou* (usually translated as “the universal”), while *sullogismos* (including *apodeixis*, i.e. demonstration) is *ek tou katholou* (typically rendered “from the universal”). Hamlyn says that there is no necessary suggestion in passages such as this one that *epagôgê* is merely a process of discovering something general or universal (Hamlyn, 171).¹⁸

In what follows, I will consider and respond to Hamlyn’s first main item of evidence in Section III and his second main item of evidence in Section IV. Then, in Section V, I will consider and respond to Hamlyn’s third and fourth main items of evidence as well as the corroborating evidence he offers in connection with these two main items. I will also criticize his interpretations, in connection with this corroborating evidence, of the three passages he reads in a way that

¹⁷ The Greek particle “*ê*,” which occurs at *APo.*, 78a35, can be translated as, among other things, “or” (to express a “genuine alternative”) or as “i.e.” Hamlyn, in the block quote above, translates it as “or.”

¹⁸ Presumably, Hamlyn considers the passage at *Top.* I, 105a13-6 as one like the one at *EN*, 1139b28ff. The *Topics* passage also suggests that *epagôgê* consists in proceeding from particular facts to a universal proposition.

makes them consistent with the claim that *epagôgê* for Aristotle is a dialectical argument. Finally, in Section VI, I will present my conclusion.

In responding to Hamlyn, my aim is to criticize his view of the *epagôgê* mentioned in *APo.* B.19 as a dialectical argument. It is not yet my aim to present my full case that the genetic account is a description of the *epagôgê* mentioned at 100b4 (which would strongly suggest that the *epagôgê* is a process of inductive discovery and justification, the more common reading). However, at the end of my criticism of Hamlyn here, we should see that there is more evidence for my position than against it.¹⁹

III. The Discovery and Justification of Principles

The first main item of evidence for Hamlyn's position, again, is that the genetic account in *APo.* B.19 prior to 100b4 is a poor account of what could justify a principle, that it would "scarcely satisfy the sceptic" (Hamlyn, 172). So, Hamlyn thinks, it is preferable to take the genetic account prior to 100b4 as intended as a account of the capacities and states needed by a student for a teacher to employ *epagôgê* (as a dialectical argument) to help the student grasp a principle. It is implausible to take the account before 100b4 as a description of the *epagôgê* mentioned at 100b4, since that would strongly suggest that the account prior

¹⁹ I will present and defend a more detailed reading of the genetic account in Chapters 4 and 5.

to100b4 is of how we discover and justify principles, making it an implausible account that would not satisfy the skeptic (Hamlyn, 181-4).

Both T. Engberg-Pedersen (Engberg-Pedersen, 315)²⁰ and Greg Bayer (Bayer, 112)²¹ object to this argument. The unstated assumption that Aristotle needs to be concerned, in the genetic account, about refuting skepticism to be concerned about the justification of knowledge claims is hardly warranted. Hamlyn writes that before providing his genetic account, Aristotle asks: “How do the first principles become known and what is the knowing state?” (Hamlyn, 181)²² Hamlyn adds that Aristotle did not ask: “How is it possible for them to be known?” (Hamlyn, 181) But as Bayer remarks:

...in asking how we come to know the principles, Aristotle is here also implying the question: How is the *knowledge* of principles made possible? (Bayer, 112, emphasis is in the original)

Bayer is saying that the second question is an obvious implication of the first, and this seems to be correct. For it seems to be impossible to answer the question of how we come to know the principles without answering the question of how knowledge of the principles is possible for us. While Hamlyn seems to be right in claiming that Aristotle is not concerned in the genetic account with refuting

²⁰ T. Engberg-Pedersen, “More on Aristotelian Epagoge,” *Phronesis*, v.24 (1979), 301-19. Unless otherwise noted, any further reference to a work by Engberg-Pedersen will be to this work.

²¹ Greg Bayer, “Coming to Know Principles in *Posterior Analytics II 19*,” *Apeiron*, Vol. 30, No. 2 (June, 1997), 109-42. Unless otherwise noted, any further reference to a work by Bayer will be to this work.

²² Presumably, this sentence is a translation by Hamlyn of *APo.*, 99b17-8.

skepticism, it does not follow from this that Aristotle is not concerned in the with the justification of knowledge claims. As Bayer writes:

...one unconcerned with skepticism is still apt to worry about the legitimacy of the principles, which are supposed to be ‘truer’ and ‘more exact’ than the sciences themselves and the source of one’s ‘unshakable’ convictions (*APo.* I 2 72b3-4). (Bayer, 112, fn. 8).²³

Further, as Bayer observes (Bayer, 112), Aristotle’s suggestion at *APo.*, 99b28-30 that the grasp of the principles (like *epistêmê*) must rest on pre-existing knowledge further suggests that Aristotle has in mind the question of what *supports* (i.e. justifies) the principles.

That Aristotle can hardly be seen to satisfy the skeptic is hardly sufficient to negate the strong suggestion of the above evidence that he is concerned in *APo.* B.19 with our coming to know (and hence the justification of) principles. In regard to the claim that the genetic account will never fully explain how we come to know principles, Engberg-Pedersen says: “This is surely correct, but it is not clear that Aristotle claims that much for his genetic account” (Engberg-Pedersen, 315). As Engberg-Pedersen observes, Aristotle adds the important remark: “...the soul is such that it is capable of undergoing this” (*APo.*, 100a13-4, trans. Engberg-

²³ Bayer’s reference to *APo.* A.2 is apparently to this clause: “...anyone who understands [*ton epistamenon*] anything *simpliciter* must be incapable of being persuaded to change his mind” (*APo.*, 72b4-5). This clause is the major piece of evidence for Bayer’s claim that understanding (*epistêmê*) for Aristotle consists of “unshakable” convictions. The major pieces of evidence that Aristotle considers the principles of demonstration to be “truer” and “more exact” than what is demonstrated can be found in B.19. Aristotle holds that the state of knowledge of principles is *nous* (*APo.*, 100b5-16). He holds that *nous* is “truer” (*alêthesteron*) (*APo.*, 100b9-11) and “more exact” (*akribesteron*) (*APo.*, 100b7-9) than *epistêmê*. Aristotle thus implies that the principles of demonstration (*nous*) are in some way “truer” and “more exact” than what is demonstrated (*epistêmê*).

Pedersen in Engberg-Pedersen, 315). “This” refers, evidently, to being aware of “primitive universals” that somehow are (or are some) principles. This quote indeed suggests that Aristotle is not concerned here with answering skeptics. But it also suggests that the claim that the genetic account will never *fully* explain how principles come to be known is not relevant as a piece of evidence that the genetic account is not concerned with the justification of knowledge claims. For, as the quote indicates, Aristotle evidently does not intend the account to offer such a *full* explanation. But, as the evidence above cited by Bayer indicates, the partial explanation indicates that Aristotle, is, in some way, concerned with the justification of the principles.

IV. How “Perception Introduces the Universal”

This leads us to Hamlyn’s second main item of evidence. Consider Passage B (quoted in Section II above) again:

[B]

[a] Let us say again what we have just said but not said clearly. [b] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; for although the particular is perceived, the perception is of the universal,--e.g. of man, not of Callias the man. [c] Next, a stand is made among these items, until something partless and universal makes a stand. E.g. such-and-such an animal makes a stand, until animal does; and with animal a stand is made in the same way. [d] Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which perception instills the universal. (*APo.*, 100a14-b5, trans. Barnes modified)

On Hamlyn's reading of this passage (and in particular, statement Bb), we have to perceive a particular, *as* something, as a member of a kind. We, for example, have to perceive Callias as a man. Hence, perceiving Callias is enough to grasp the universal man (Hamlyn, 181). Given this reading, Hamlyn argues that even if we take induction as a process of acquiring knowledge of a universal truth from sense experience of particulars, Passage B claims something that conflicts with the claim that the senses implant a universal *through induction*. It claims that a universal is implanted directly from the sense perception of (presumably) a single particular. Hence, Hamlyn argues, "in this way" (or "this is the way in which," in Barnes' translation above) must be referring, not to "induction" (*epagôgê*) at 100b4, but to the genetic account prior to 100b4. (This leaves Hamlyn free to argue that the *epagôgê* mentioned at 100b4 is a dialectical argument—see Section V below.)

In response to this, we should first reconsider my response above to Hamlyn's citing of his first main item of evidence. Aristotle does seem to be concerned in some way in the genetic account with the justification of principles. If so, one may not claim that, since *epagôgê* is a kind of attempt at justification, "in this way" at *APo.*, 100b5 must, to avoid the implication that the genetic account is concerned with justification, refer back to the genetic account prior to 100b4 rather than to "*epagôgê*" at 100b4.

Further, we should consider a crucial part of Passage B, and consider whether Aristotle thinks that the sense perception of a single particular is enough to implant a universal that the particular instantiates into the mind of the perceiver. Here is the crucial part of Passage B that suggests that sense perception of a single particular is a direct means of grasping a universal:

[C]

[a] When one of the undifferentiated items makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular [*to kath' hekaston*] is perceived, [d] the perception is of the universal [*tou katholou*],—[e] e.g. of man, not of Callias the man. (*APo.*, 100a14-b1, trans. Barnes modified²⁴)

The first problem with Hamlyn's reading of this passage is that the text of the passage does not seem to support the reading. For if Passage C says that one gets the universal through a process that is like perceptual recognition—by having to perceive Callias, for example, as a man—then it seems accurate to say that, in the act of acquiring the universal man, one's perception is (for example) of *Callias the man*. Yet this is precisely what Passage C rules out: "...perception is...of man, not Callias the man."

To determine how to read Passage C correctly, it is useful to consider Aristotle's views on what is and is not an object of sense perception. The grammar of Passage C suggests that Aristotle considers particulars to be the

²⁴ "[T]he particular is perceived" replaces Barnes' "you perceive particulars," and "the perception is of the universal" replaces Barnes' "perception is of universals." This is done to make the translation more closely reflect the Greek.

objects of sense perception. To see this, consider the translation of this crucial part of the passage, Cb-d: “for although the particular is perceived, perception is of the universal...” The Greek for this part is as follows: “*kai gar aisthanetai men to kath’ hekaston, hê d’ aisthêsis tou katholou estin...*” (A*Po.*, 100a16-b1) Note that the “*men-de*” construction (rendered by Barnes with “although”) indicates a contrast between the “*men*” clause (Cc) and the “*de*” clause (Cd).

Moreover, it seems that the translation of “*tou katholou*” as “of the universal” is correct. For a genitive that does not indicate a temporal clause (as this one does not) is almost always translated with “of.”

Further, in the translation of the “*men*” clause as “the particular is perceived,” “the particular,” as the passive grammatical subject of the verb “is perceived,” denotes the *object* of the act denoted by that verb. I think that this is a good translation because there is a strong piece of textual evidence that Aristotle considers particulars to be the *objects* of sense perception. The piece of textual evidence is a passage from *On the Soul*:

[D]

[a] ...actually perceiving is spoken of in the same way as contemplation [*tôi theorein*]. [b] Yet there is a difference between them in that those things that are productive of actual perception are external, the visible and the audible and in the same way all the other sense-objects [*aisthêton*]. And the reason for this is that [c] perception [*aisthêsis*] in activity is of particular things [*tôn kath' hekaston*], [d] knowledge [*epistêmê*] of universals [*tôn katholou*], which are in a way in the soul itself. [e] Thus it is for a man to think [*noêsai*], whenever he will, but not so for him to perceive, because for that the presence of a sense-object is necessary. [f] And this applies in the same way even to our knowledge of the sense-objects, and for the same reason, namely that [g] the sense-objects are among the particular and external things. (DA, 417b19-28)

At first, it may seem that Passage D is not good evidence that Aristotle regards particulars to be the objects of sense perception, since statement Dc about actual sense perception is not (in Greek) grammatically parallel to statement Cc but to Cd.²⁵

There is, however, strong evidence in Passage D that Aristotle regards particulars to be the objects of perception. For statement De says that sense perception requires the presence of a sense-object (*aisthêton*), presumably within the range of sense perception.

Indeed, Passage D provides strong evidence that for Aristotle *only* particulars are the objects of sense perception. For statement Dg says that the

²⁵ Again, the Greek for “the particular is perceived” (statement Cc) is: “*aisthanetai...to kath' hekaston*” (APo., 100a17). The Greek for “the perception is of the universal” (statement Cd), again, is: “*hê d' aisthêsis tou katholou estin*” (APo., 100a17-b1). The Greek for “perception in activity is of particular things” (statement) Dc is: “*tôn kath' hekaston hê kat' energeian aisthêsis*” (DA, 417b22).

sense-objects are (among) the particular, external things. And this statement tells us of a part of one of three distinctions between the objects of sense perception and those of *epistêmê*. First, the objects of the activity of sense perception are particulars (presumably, such as Callias the man), whereas those of the exercise of *epistêmê* are universals (presumably, such as man). Second, the objects of the activity of sense perception are external to the soul and must be present (meaning, presumably, within perceivable range) for a person to be able to actively perceive. The objects of the exercise of *epistêmê*, however, are “in a way” within the soul. It seems that according to Passage C, these objects are universal concepts or ideas (such as the concept or idea of man) and, as such, are in the mind.²⁶ Such concepts or ideas (or at least the veridical ones), for Aristotle, would be mental grasps of universal kinds in nature.²⁷ Third, because such concepts or ideas are

²⁶ One might want to insist here that the objects of *epistêmê* are universal true *propositions*, not concepts, since *epistêmê* (given its technical definition in the *Posterior Analytics*) consists of *conclusions* (which are *propositions*) of demonstrations. One should, however, bear in mind two considerations. First, even if *epistêmê* is taken in that technical sense, it does not mean that the “objects of *epistêmê*” in Passage C are necessarily propositions. For “objects of *epistêmê*” is a rather vague expression (even if “*epistêmê*” is taken in the technical sense), and it is conceivable that Aristotle could consider universals such as man (which, as things “in the soul” would be concepts or ideas) to be objects of *epistêmê*. For a conclusion of a demonstration must consist of one or more universal concepts. And the genetic account in *APo.* B.19, which gives man and animal as examples of universals, suggests that Aristotle considers universal concepts as important to *nous* (and, as a consequence, to *epistêmê*, which is supposed to be based on *nous*). Second, even if we grant that the “objects of *epistêmê*” in Passage C are universal propositions, Passage C would still indicate that sense perception is not sufficient to grasp universal concepts. For, again, universal propositions that would be the objects of *epistêmê* would consist of one or more universal concepts. And it is implausible to think that Aristotle would think that *epistemonikoi* propositions are “in a way in the soul,” but that universal concepts that make up these propositions are completely external to the soul as sensible objects are.

²⁷ One might object here that since Passage D is about *epistêmê* and Passage C is fairly clearly about *nous*, Passage D is discussing different universal objects (those of *epistêmê*) than Passage C

“in the soul,” the person who possesses them can think when he or she wishes; unlike actual sense perception, actual thinking is not dependent on the presence of external objects.²⁸ Such distinctions strengthen the suggestion that *only* particular, external things are the objects of perception.

Given that Aristotle thinks that only particulars are the objects of sense-perception,²⁹ it is clear that in statement Cc, the particular is the object of sense perception. It is thus also evident that the clause implies that sense perception is *all* that is needed to be aware of the particulars present within the range of sense perception.³⁰

(which is on those of *nous*). (See *APo.*, 100b5-17 where Aristotle says that the state of having principles is *nous*, and contrasts *nous* with *epistêmê* (among other states).) However, even if one takes “*epistêmê*” in Passage D in the technical sense of the *Posterior Analytics* (i.e., as the cognitive product of an explanatory demonstration), one should bear in mind that the principles of demonstration include (or are the same as) the ultimate premises of demonstration. As each such ultimate premise would be a two term proposition, and it is from these that the conclusions that constitute *epistêmê* are deductively derived, the universal terms of *epistêmê* are also the universal terms of *nous*.

²⁸ It may, however, be the case that Aristotle thinks that actual thinking (at least when it is not entirely introspective) depends on the *existence*, if not the presence, of external objects which are natural kinds.

²⁹ It seems that “sense-object” in Passage C should cover *both* particular qualities that are each apprehended by a certain sense organ *and* substances (as particular matter-form composites) that are apprehended by the “common sense.” For since qualities must be “present in” substance particulars (as per the *Categories*), if particular sense qualities must be present for a person to perceive, then particular (matter-form) substances that can be sensed must also be present.

³⁰ This is further supported by the fact that *APo.* B.19 at 99b35-100a10 indicates that all animals have sense perception but not all animals have faculties beyond sense perception. If particulars are the objects of sense perception, and some animals have only sense perception as a cognitive faculty, then the suggestion is that sense perception is *all* that is needed to perceive particulars. See also Passage E from *On the Soul* below, which makes the similar claim that all animals have sense perception but not all have intellect.

By contrast, in the translation of the “*de*” clause (statement Cd) as “the perception is of the universal,” it is rather clear “the universal” is not intended to denote the object of perception.³¹ If particulars for Aristotle are the *only* objects of sense perception and we bear in mind that there is a *contrast* intended between the “*men*” and “*de*” statements (statements Cc and Cd respectively), “the universal” in statement Cd, for the clause from Cb-d to make sense, cannot denote the object of sense perception. What exactly statement Cd amounts to, I will discuss in Chapter 4. For now, I simply maintain that in statement Cd, the universal is not the *object* of perception (i.e. that “*tou katholou*” in that clause is not intended to be in the genitive of *object*).³²

But given that Aristotle does not think that universals are *objects* of sense perception, does Passage C still not suggest that the sense perception of a single particular is enough to implant a universal in the soul? That is, does it still not suggest that sense perception introduces the universal without any ampliative induction?

Given my criticisms so far of Hamlyn’s first and second main items of evidence, I do not think we have good grounds to read Passage C in such a way.

³¹ Put differently, it seems clear that “*tou katholou*” in the clause is not intended to be in the genitive of *object*.

³² However, given all the evidence that Aristotle considers only particulars to be the objects of perception, “*tôn*” from “*tôn kath’ hekaston*” from statement Dc (see fn. 25) *should* be considered to be in the genitive of object. In a similar statement in *APo.* A.18 (“...perception is of the particulars...” (*APo.*, 81b6, trans. mine), where the Greek is: “*tôn... kath’ hekaston hê aisthêsis...*”), “*tôn*” should be taken as being in the genitive of object.

Hamlyn, and others who read Passage C in Hamlyn's way,³³ may be reading statement Cd that "the perception is of the universal" in a particular way. They may think the statement can be re-worded as: "One perceives the universal of the particular." (An instantiation of this statement would be: "One perceives man of Callias.") However, apart from the question of whether this is accurate as just a *re-wording* of the statement from Passage C (which is doubtful), there are two problems with reading the statement in this way. The first is that, according to this alleged re-wording, one perceives the universal (for example, man). And, as I provide evidence for, Aristotle does not think that universals are objects of sense perception. In Passage C itself, Aristotle says that the *particular* is perceived. Second, in connection with that evidence provided, the *accurate* statement to ascribe to Aristotle would be something like one of the following: (1) "One thinks (*noêi*) the universal of the particular." (2) "One predicates (*katêgorêi*) the universal of the particular." (3) "One knows (*gnôrizêi*) the universal of the particular." But it seems that none of these can be proffered, with even remote plausibility, as just *re-wordings* of the statement Cd that "the perception is of the universal." And so such alleged re-wordings of that statement can hardly be used as evidence for reading Passage C as saying that acquiring a universal involves something like perceptual recognition.

³³ Barnes reads clause Cb-e in the same way as Hamlyn does. See Barnes, 266.

Further, an earlier part of the genetic account indicates that (at least typically), many sense perceptions—not just one—are required to grasp a universal. After Aristotle’s statement that all animals (including humans) have sense perception, but that only some animals can retain percepts³⁴ in memory, Aristotle states the following:

[E]

...from perception there comes memory, as we call it, and from memory (when it occurs in connection with the same item), experience [*empeiria*]; for memories which are one in number form a single experience. And from experience, or from all the universal which has come to rest in the soul (the one apart from the many, i.e. whatever is one and the same in all these items), there comes a principle of skill or understanding... (*APo.*, 100a3-8)

The suggestion of Passage E in connection with what is stated just before it is that to grasp the universal man, for example, one must perceive many men (not just Callias or any one man), and retain perceptions of men in memory. Such retained percepts form an experience (an *empeiria*), and the experience gives one the grasp of the universal man. (I will discuss shortly the “principle” that Passage E claims comes from a universal.) How does this affect our reading of Passage C? The first sentence of Passage B (of which Passage C is a part), again, is: “Let us say again what we have just said but not said clearly” (*APo.*, 100b14-5). As this sentence indicates, Passage B is a *restatement* of an earlier part of the genetic account.

³⁴ A “percept” in the genetic account is, presumably, an object of sense perception, and Passage E indicates, something retained in memory. I will discuss this in more detail in my reading of the genetic account in Ch. 4.

Hence, given Passage E, we do not have good grounds to read Passage C as claiming that the sense perception of a *single* particular (such as Callias) *immediately* gives one a universal (such as man). For as Passage E suggests, multiple sense perceptions of instances of the universal must be retained in memory (as percepts) to form an experience, and this experience allows one to grasp the universal.³⁵

Hamlyn himself thinks that according to Passage E, one needs to perceive and retain in memory many instances of a universal one has already grasped in order to come to recognize them *as* instances of the universal. This creates a state (*hexis*) of mind that is needed by a student for a teacher to be able to use a dialectical *epagôgê* to get the student to grasp a propositional principle of demonstration (Hamlyn, 176-7, 181-2). But Passage E does not indicate that one begins the process with a universal concept already acquired, or that one acquires it from perceiving just one instance. Whatever the details of the correct reading of Passage E, the cognitive progression indicated by that passage is from perception to memory, from memory to an experience (*empeiria*), and from an experience to a universal.

³⁵ As Richard McKirahan remarks about taking Passage C to claim that the perception of a single particular immediately instills a universal, "...if perception does so much, what need is there for memory and experience?" (McKirahan (1992), 253). (Richard D. McKirahan, Jr., *Principles and Proofs: Aristotle's Theory of Demonstrative Science* (Princeton, NJ: Princeton University Press, 1992). (Any further reference to McKirahan (1992) will be to this work.)

At this point one might object that the genetic account still does not seem to indicate ampliative induction as the means of coming to know principles. For it appears to describe of process of grasping universal *concepts* from sense perception, whereas ampliative induction consists of discovering (or purporting to discover) a general truth (and a truth is a *proposition*) from sense perception.

I think there are, however, three considerations that indicate that we should read the genetic account as not just about grasping concepts, but also about grasping certain general propositional truths connected to the concepts grasped. First, near the beginning of *APo.* B.19, Aristotle asks the questions how the principles (*archai*) get to be known and what is the knowing state (*APo.*, 99b18-9). He then says that "...this will be plain from what follows when we have first set out the puzzles" (*APo.*, 99b19-20), indicating that this is what the rest of the chapter seeks to answer. This strongly suggests that after the "puzzles" about coming to know principles are set out at 99b20-35, Aristotle seeks to answer those two questions. As *states* of knowledge are explicitly discussed at 100b5-17, it appears that the genetic account (at 99b35-100b5) seeks to answer the *first* of the two questions. And there is a strong suggestion early in the *Posterior Analytics* that the "principles" ("*archai*"), "primitives" ("*prôta*"), and "immediates" ("*amesa*") are intended to be synonymous, all referring to the ultimate premises of

demonstration.³⁶ This suggestion seems to be confirmed—or at least not contradicted—in B.19: “I have said earlier that you cannot understand anything through a demonstration unless you know the *primitive immediate principles*” (*APo.*, 99b20-3, emphasis added).

Second, *APo.* A.4 apparently requires that the predication in an ultimate premise of demonstration is an *essential* (i.e., definitional) predication.³⁷ If propositional principles that are ultimate premises of demonstration are definitional truths, we can plausibly read the genetic account as about how we acquire concepts *and* certain definitional propositional truths connected with a grasped concept.

Third, the last sentence of Passage E says that from the grasp of a universal, “...there comes a principle of skill or understanding...” (*APo.*, 100a6-9), which can be taken as claiming that from a grasped universal concept, one gets a propositional principle about that concept.

³⁶ Early in the *Posterior Analytics*, Aristotle states: “...demonstrative understanding [*epistêmên*]...must proceed from items which are true and *primitive* [*prôtôn*] and *immediate* [*amesôn*]...There can be a deduction if these conditions are not met, but there cannot be a demonstration...” (*APo.*, 71b20-4, emphases added). A little later, Aristotle indicates that he uses the terms primitive (*prôtôn*), immediate (*amesôn*), and principle (*archê*) interchangeably: “To proceed from primitives is to proceed from appropriate principles (I call the same things primitives and principles). A principle of demonstration is an immediate *proposition* [*protasis*]...” (*APo.*, 72a7-9, emphasis added).

³⁷ In particular, the requirement at *APo.*, 73a35-b5 that the predication hold *kath’ auto* (“in itself”) of the subject indicates this. This passage indicates that the predication holds *kath’ auto* of the subject if the predicated term is in the “what it is” (i.e., definition) of the subject, or if the subject is in the “what it is” of the predicated term.

At the end of Passage B is a statement (which is Passage A) of how “primitives” are acquired:

[B]

[a] Let us say again what we have just said but not said clearly. [b] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; for although the particular is perceived, the perception is of the universal,--e.g. of man, not of Callias the man. [c] Next, a stand is made among these items, until something partless and universal makes a stand. E.g. such-and-such an animal makes a stand, until animal does; and with animal a stand is made in the same way. [d] Thus it is plain that [100b4 begins here:] we must get to know the primitives by induction [*epagôgêi*]; for [100b5 begins here:] this is the way in which perception instills the universal. (*APo.*, 100a14-b5, trans. Barnes modified)

While the suggestion by the passage that the “primitives” are *concepts* like man and animal, the three considerations above indicate that it should be read also as an account of how we acquire certain propositional principles that are definitionally connected to the concepts acquired.³⁸ Hence, from the grasp of the concept man, one gets a definitional principle like, “All (or most)³⁹ men reason.” From the grasp of the concept animal, one gets a definitional principle like, “All (or most) animals have sense perception.” Hence, the genetic account up to its end

³⁸ And hence, Aristotle may have a wider sense of “primitive” (“*prôton*”) which includes both object items (including concepts) and ultimate premises (i.e., propositions) of demonstration, and a narrower sense that refers only to the ultimate premises of demonstration. Similarly, he may have two senses of “principle” (“*archê*”) which are synonymous to the first and second sense of “primitive” respectively.

³⁹ I will begin some expressions of putative Aristotelian propositional principles with “All (or most)” to accommodate the view, discussed in Ch. 1, Section I, that the principles Aristotle claims are only “for the most part” are ones for which, perhaps among other things, the quantifier is “most” rather than universal.

(i.e., the end of Passage E) should be seen as not *just* about acquiring concepts (though this seems clearly involved), but correlatively indicating a process of ampliative induction that yields certain definitional, propositional principles connected with the concepts grasped.

We are now in a position to criticize Hamlyn's position that "*epagôgêi*" at *APo.*, 100b4 (in Passage A) cannot be referring to the genetic account prior to 100b4, since the Passage C claims that sense perception of a single particular is enough to grasp a universal. As I have argued, Passage C should not be taken as claiming that sense perception of a single particular alone is enough to grasp the universal. This leaves out memory and the need for an experience consisting of many percepts, expressed earlier in the genetic account.

And, if we recognize that, then the genetic account can be seen as description of a process of *epagôgê*, a process of reasoning from the particular (which, in the context of what the genetic account, is perceived) to the universal.⁴⁰ And given this, it is very unnatural to read "in this way" in Passage A (at *APo.*, 100b4) as skipping "*epagôgêi*" at 100b4 and referring back to the genetic account

⁴⁰ This, of course, is based on Aristotle's description of *epagôgê* (which I discuss in Chapter 2) as reasoning from the particular to the universal. One may ask at this point whether the genetic account as a description of (a kind of) *epagôgê* would be reasoning to a universal *concept* or *proposition*. As I have argued above, reaching concepts like man and animal is in some way involved, but reaching definitional propositional principles about the concepts grasped is apparently also involved. I agree with Hamlyn's claim (Hamlyn, 178-9) that in common readings of the genetic account, reaching a universal concept in this context is correlative with reaching a universal proposition (see fn. 36). But again, I will discuss my reading of the genetic account in more detail in Chapters 4 and 5.

prior to 100b4. For *epagôgê* is clearly a “way.” And if “in this way” at 100b4 is supposed to skip the way mentioned at 100b4—*epagôgê*—and refer back to the genetic account prior to 100b4, we should expect Aristotle at 100b4 to have said “in *that* way” (“*ekeinô*”) instead of “in *this* way” (“*houtô*”). But “in this way” (“*houtô*”) is what Aristotle does say at 100b4.⁴¹

Thus, contrary to Hamlyn, the common reading of the genetic account as a description of the *epagôgê* mentioned at *APo.*, 100b4 is evidently the correct way to read it. And such a reading suggests that the *epagôgê* consists in (or involves) ampliative induction.⁴²

⁴¹ “*Houtos*” is a demonstrative pronoun, usually translated as “this,” which refers to something *near* in place, time, or thought (Smythe, 307). (Herbert Weir Smyth, *Greek Grammar* (Cambridge, MA: Harvard University Press), 1972. Any further references to Smyth will be to this work.) “*Ekeinos*” is a demonstrative pronoun, usually translated as “that,” which refers to something more remote in place, time, or thought. “*Houtô*” is an adverbial form of “*houtos*,” often translated as “in this way.” “*Ekeinô*” is an adverbial form of “*ekeinos*,” often translated as “in that way.” (See Smythe, 100-1. See also Liddell-Scott, 238, 580.)

⁴² Evidently, then, *epagôgê* (that is based on sense perception) is Aristotle’s short answer to his first question at *APo.*, 99b18-9, namely, how we come to know the principles. Hence the following objection does not seem to be a good one. In his claim in Passage E that from the grasp of a universal, “...there comes a principle of skill or understanding...” (*APo.*, 100a6-9), Aristotle may mean that once a universal concept is grasped, a definitional principle about the concept is grasped by “analytically unpacking” the concept, so the definitional principle is not obtained by induction. Recall the indication I give earlier (see fn. 36, 37, and 38) that the genetic account is not just concerned with the acquisition of concepts but also of propositional principles. His short answer at the end of the account of how the *archai* (apparently, both concepts and propositional principles), again, is evidently *epagôgê*. Aristotle in the account does not make any exception for propositional principles, by saying (for example) that these are reached by “analytical unpacking” rather than by *epagôgê*.

V. *Epagôgê* and Dialectic

We can now turn to Hamlyn's third and fourth main items of evidence.

His third main item of evidence is, again, that Aristotle in the *Metaphysics* credits Socrates with the discovery of *epagôgê*, who, Hamlyn claims, used it as a dialectical argument, not as ampliative induction. The fourth main item is that the discussion in *APo.* B.19 of coming to know principles, in which *epagôgê* is involved, seems to refer back to A.1, which is a chapter that suggests that for Aristotle both syllogistic and epagodic arguments are offered in a dialectical (teacher-student) context.

Further, *APo.* A.1 and (apparently) B.19 refer to the problem in Plato's *Meno*, A.1 explicitly and B.19 implicitly. And, in connection with the first two main items of evidence, Socrates in the *Meno* appears to use *epagôgê* in a dialectical context, as an argument applying a general principle to particular cases. Further, *APr.* B.21 explicitly refers to the *Meno*, and suggests that *epagôgê* is an argument consisting of a general principle being applied to a particular case.

With regard to these two main items of evidence, we should first note my defense above of the common reading of the genetic account of *APo.* B.19 as a description of *epagôgê* used to obtain principles. If the genetic account is a description of *epagôgê* used to obtain principles, then at least sometimes (i.e., at least in the process of obtaining principles) *epagôgê* for Aristotle is a process of discovery.

Second, two remarks made by Richard McKirahan appear to be correct.⁴³ First, while Aristotle in the *Metaphysics* does credit Socrates with the discovery of *epagôgê*, it is not clear that Aristotle means to credit Socrates for the *features* Hamlyn thinks are essential to Aristotelian *epagôgê* (at least as it occurs in *APo.* B.19). These features are: being dialectical, and involving an application of general principles to particular cases (McKirahan (1983), 3). McKirahan seems to be correct in regard to this claim and we will consider some evidence shortly that Aristotle does not think that being dialectical and involving an application of a general principle to cases are *essential* to *epagôgê*. Second, even though *APr.* B.21 and *APo.* A.1 make explicit reference to the *Meno*, we may still doubt that for Aristotle all *epagôgê* fits the model of the *Meno*, i.e. is a dialectical argument involving the application of a general principle to one or more particular cases (McKirahan (1983), 3-4).⁴⁴ Let us consider why.

In addition to my defense above of the common reading of the genetic account in *APo.* B.19, the following passage from *APr.* B.23 provides some evidence that Aristotle did indeed consider some *epagôgê* to be ampliative induction:

⁴³ The remarks are in Richard D. McKirahan, Jr., "Aristotelian Epagoge in *Prior Analytics* 2.21 and *Posterior Analytics* 1.1," *Journal of the History of Philosophy*, Vol. 21, No. 1 (Jan., 1983), 1-13. Any further reference to McKirahan (1983) will be to this work.

⁴⁴ McKirahan (McKirahan, 1-13) classifies Aristotelian *epagôgê* into four classes. However, we do not need to agree (or disagree) with his particular classification to see the truth of the above two remarks.

[F]

...we have conviction about anything either through deduction [*sullogismos*] or from induction [*epagôgê*]. (*APr.*, 68b13-4)

Smith translates “*pisteuomen*” at 68b13 as “we have conviction.” The relevant Liddell-Scott definition for the entry “*pisteuô*” is: “—*to trust, trust to or in, put faith in, rely on, believe in a person or thing...*” (Liddell-Scott, 641). Smith translation seems apt because, as the context indicates, Aristotle is referring to reasoning (syllogistic or epagodic) as the basis of something. And Aristotle surely knows that some beliefs held by some people are arbitrary, i.e. not based on any reasoning.⁴⁵ So, rendering “*pisteuomen*” as “we have belief” would seem to be less than adequate. Further, rendering “*pisteuomen*” as “we trust,” “we rely on,” or “we put faith in” would not be plausible, as the preceding context indicates. For what is immediately before that quoted passage is the following:

[G]

But now it should be explained that not only dialectical and demonstrative deductions [*sullogismoi*] come about through the figures previously mentioned, but also rhetorical ones, and absolutely any form of conviction [*pistis*] whatever, arising from whatever discipline. (*APr.*, 68b9-13)

⁴⁵ Consider, as an example of evidence for this, a statement from the *Physics* about what a person offering a theory should do: “...he should not make any mere assumption or lay down any unreasoned axiom, but should employ either inductive [*epagôgên*] or demonstrative [*apodeixin*] reasoning” (*Phys.*, 252a23-5). This passage strongly suggests the recognition that a person is capable of holding a belief without reason.

As its surrounding context indicates, Smith's translation of "*pistis*" here as "conviction" is apt, since the passage is about reasoning.⁴⁶ Hence, in Passage F, taking "*pisteuomen*" as "we trust," "we rely on," or "we have faith in" would seem to introduce an odd shift in subject-matter—a shift to matters of trust, reliability, or faith. So, again, Smith's translation of "*pisteuomen*" in the first quoted passage as "we have conviction" seems correct.

Consider Passage F again. If Aristotle meant by "*epagôgê*" in that passage what Hamlyn suggests he must have meant, the passage would not be plausible. For then, the passage would claim that we have *any* conviction through deduction or through dialectical argument that consists of the application of a general principle to one or more particular cases. Given Aristotle's sense-based epistemology, it is not plausible that the conviction that all normal humans have two eyes, for example, comes from a dialectical argument consisting of an application of a general principle to particular cases. At least, it is not plausible that such a conviction *usually* comes about that way. Aristotle must have known that children, for example, typically have such a conviction, and that it is not likely that that a child obtains it through a dialectical argument (with a teacher or

⁴⁶ The relevant Liddell-Scott definition of "*pistis*" here is: generally persuasion of a thing, confidence, assurance..." (Liddell-Scott, 641)

anyone else). Nor is it usual for such a conviction to come about from deduction.⁴⁷

The same applies to the conviction that all normal horses have four legs, a conviction which, like the last, would probably be common in Aristotle's time. It is hardly plausible that this conviction would *usually* be reached by a dialectical argument consisting of the application of a general principle to particular cases. Aristotle must have been aware that, in the minds of most people, this conviction did not come from deduction.⁴⁸

The problem of ascribing to Aristotle these highly implausible positions is solved if we take "*epagôgê*" in the passage in the more general way than what Hamlyn suggests, so that the term includes induction as a process of discovery. The convictions that all normal humans have two eyes and that all normal horses have four legs would probably have been reached by most people in Aristotle's time as children, through ordinary (and perhaps naïve) processes of ampliative induction from sense perception. The claim that Aristotle would have been aware of this is plausible; its denial is not.

⁴⁷ If Aristotle thinks there can be *epistêmê* consisting of such a conviction, then he would think that, *as epistêmê*, it comes about from demonstrative (apodeictic) deduction.

⁴⁸ Again, in the conceivable case that Aristotle thinks that there can be *epistêmê* consisting of such a conviction, then he would think that, *as epistêmê*, it would come about from demonstrative deduction.

Now consider Hamlyn's claim that *APo.* B.19 refers back to A.1, which discusses arguments in a teaching-and-learning context (and so the *epagôgê* of B.19 should be taken as a dialectical argument). What I have argued so far indicates that while B.19 may be connected to A.1 (and I think it clearly is), the beginning of A.1 should not (and need not) be taken as claiming that *all* arguments are part of a teaching and learning context. Clearly, the chapter indicates that Aristotle thought that *some* epagogic arguments *are* part of such a context. So, we can imagine a situation in which a student has percepts accumulated in memory (as the genetic account of B.19 suggests) but has not him- or herself drawn the inductive conclusion—the principle (*archê*)—that all of what is near is non-twinkling. The teacher can offer an *epagôgê* to get the student, on the basis of his or her pre-existing perceptual cognitions, to see the truth of that principle. It would seem that in most cases, however, the student can complete the process of *epagôgê* (as ampliative induction) and reach the principle him- or herself.⁴⁹

Further, the mention of epagogic arguments in *APo.* A.1 at 71a5-11 is not necessarily referring *only* to *epagôgê* used to reach principles of demonstration (of the reason why⁵⁰). Evidently, Aristotle thinks that some claims reached by

⁴⁹ My reading, so far, of the genetic account *suggests* that this is the normal occurrence.

⁵⁰ Throughout most of the *Posterior Analytics*, Aristotle seems to call “demonstrations” what in *APo.* A.13 he calls “demonstrations of the reason why.” These are contrasted in that chapter with

epagôgê, such as the claim that “the moon waxes in this way,” can also given an explanatory demonstration, and are not themselves principles of explanatory demonstration.⁵¹ Hence, we are not justified in using *APo.* A.1 as necessarily evidence about the nature of the *epagôgê* mentioned in *APo.* B.19. This weakens the claim that since A.1 is discussing teaching and learning, it is evidence that the *epagôgê* mentioned in B.19 is a dialectical one employed in a teaching-learning context.

We can now consider Hamlyn’s items of evidence that corroborate the last two main items of evidence.

One such corroborating item is Hamlyn’s reading of the passage at *APo.*, 81b6ff. According to Hamlyn, this passage states that “one cannot have *episteme* of particulars—

for neither can one get to them from universals (*sc.* universal propositions) without *epagoge*, nor can one get to them through *epagoge* without sense-perception. (*APo.*, 81b7-9, trans. Hamlyn in Hamlyn, 169-70)

“demonstrations of the fact,” which are valid syllogistic deductions and have true premises like the former, but do not have an explanatory middle term.

⁵¹ See *APo.* A.13, 78b3-11. Aristotle gives this example of a “demonstration of the fact”: all of what waxes in this way is spherical ; the moon waxes in this way; so, the moon is spherical (*APo.*, 78b4-7). “The moon waxes in this way” would, apparently, be reached by an *epagôgê* consisting of observing the shape of the lighted part of the moon on different nights, and then drawing the conclusion that it “waxes in this way.” But apparently, this epagogic conclusion would not be a principle of a demonstration (of the reason why). For his suggestion of a corresponding demonstration of the reason why is: all of what is spherical waxes in this way; the moon is spherical; so, the moon waxes in this way (*APo.*, 78b6-11). “The moon waxes in this way” is not and cannot be a principle of this demonstration of the reason why (for otherwise this attempted demonstration would beg the question).

According to Hamlyn, this passage, says, more specifically,

...that the application of general principles to particular cases presupposes *epagoge* and that the application of *epagoge* itself presupposes sense-perception. The latter is true when *epagoge* is considered as a form of argument—the use of cases in general argument presupposes sense-perception as a means of getting experience of the cases. (Hamlyn, 170)

Hamlyn's reading of the passage at *APo.*, 81b6-9 depends on his translation and his translation is questionable. To evaluate Hamlyn's translation, we should consider the Greek from the OCT:

tôn gar kath' hekaston hê aisthêsis • ou gar endechetai labein autôn tên epistêmên • oute gar ek tôn katholou aneu epagôgês, oute di' epagôgês aneu tês aisthêseôs. (APo., 81b6-9)

This passage is at the end of the short chapter *APo.* A.18 (which is at 81a37-b9).

Before this passage, Aristotle presents a conditional claim, which I have presented in Ch. 1:

It is clear too that if some perception is wanting, some understanding [*epistêmê*] must also be wanting—understanding which it is impossible to get if we learn either by induction [*epagôgêi*] or by demonstration, if demonstration depends on universals and induction on particulars, if it is impossible to study universals except through induction...and if it is impossible to make an induction without having perception... (*APo.*, 81a37-b6)

Barnes' translation of *APo.* A. 18 up to this point seems consistent with (though not necessarily indicative of) Hamlyn's reading of the rest of the chapter. As such, Barnes' translation up to this point seems uncontroversial. We can now consider

the rest of Ch. A. 18 quoted in Greek above. A translation of it, more literal than either Hamlyn's or Barnes', would be as follows:

For perception is of things that are particular: for it is not possible to get understanding [*epistêmê*] of them, neither from the universal without induction [*epagôgê*], nor through induction without perception. (*APo.*, 81b6-9, trans. mine)

While this translation might be consistent with Hamlyn's reading of the passage, it does not *suggest* his reading as his translation does. And, yet, there does not seem to be any reason why one should want to translate it Hamlyn's way, other than to suggest his reading of the passage.

A more straightforward way of reading *APo.* A.18 (which I have used in Ch.1) is to take it as claiming the following. Understanding (*epistêmê*) depends on *epagôgê*, since *epagôgê* is used to reach principles of understanding (viewed as identical to or including the ultimate premises of demonstration). And, *epagôgê* depends on sense perception. So, if sense perception is lacking, understanding will be lacking. Given my defense above of the common reading of the genetic account of *APo.* B.19 as a description of *epagôgê* used in reaching principles of demonstration, this reading of *APo.* A.18 is not only more straightforward, but also more consistent than Hamlyn's with B.19.

We can now consider the second passage that Hamlyn considers in connection with his last two main items of evidence. At *APo.*, 78a30-4, Aristotle seeks to "demonstrate the fact" that all planets are near through their not

twinkling. Aristotle needs to establish the premise that all of what is non-twinkling is near. He says of this premise: “(Let this be assumed through induction [*epagôgês*] or [*ê*] through perception.)” (*APo.*, 78a34-5) Hamlyn’s position regarding this passage, again, is that “[w]hether the ‘or’ is an ‘i.e.’ or whether it expresses a genuine alternative,” the passage cannot be taken as guaranteeing that *epagôgê* is ampliative induction (Hamlyn, 169). For even if *epagôgê* is a dialectical argument, it can surely still make use of facts of sense perception (Hamlyn, 169).

Hamlyn’s argument here does not clinch the claim that the *epagôgê* mentioned here is a dialectical argument. But in connection with other items of evidence he offers, he is right to want read the passage in this way. However, in light of the criticisms already made of other items of Hamlyn’s evidence, there does not seem to be any good reason to think that “*epagôgês*” here does not mean ampliative induction, or at least denote a wider concept that *includes* ampliative induction. For it is conceivable that Aristotle thinks that in some cases, a person may have the relevant sense experience and from that draw the conclusion that all of what is non-twinkling is near. But he may think that in other cases, a person has the relevant sense experience, but needs to be persuaded through a dialectical *epagôgê* based on that experience. Hence, it is perhaps most reasonable to think that “*epagôgês*” here is a general concept that subsumes both ampliative and dialectical induction.

We can now consider the third passage that Hamlyn interprets in accordance with his last two main items of evidence. It is the passage at *EN*, 1139b28ff. Again, this passage suggests that *epagôgê* is the *archê* (principle or origin or starting point) of *to katholou* (the universal), and that *sullogismos* (including *apodeixis*) is *ek tou katholou* (from the universal). Hamlyn says that this does not necessarily suggest that *epagôgê* is merely a process of discovering something general or universal (Hamlyn, 171).

Again, given the criticisms made of Hamlyn's other items of evidence, it is reasonable to think that "*epagôgê*" here at least *includes* ampliative induction (in addition to dialectal induction).⁵² In particular, this is the only way to make this passage consistent with my defense of the common reading of the genetic account in *APo.* B.19 as a description of the *epagôgê* used to reach principles of demonstration.

VI. Conclusion

Hamlyn's claims of evidence in "Aristotelian Epagoge" that the *epagôgê* of *APo.* B.19 is a dialectical argument rather than what is described by the genetic account prior to 100b4 do not ultimately seem to be correct. On the contrary, it

⁵² A similar claim can be made about the passage at *Top.* I, 105a13-6 which suggests that *epagôgê* is proceeding from particular facts to a universal proposition. Although the subject matter of the *Topics* is dialectic, and Aristotle is concerned there with specifically with *epagôgê* that is dialectic (rather than *epagôgê* in general), observe that this passage does not explicitly define *epagôgê* *dialektikos* but merely *epagôgê*. Hence it is reasonable to think that this definition is intended to subsume both non-dialectical and dialectical *epagôgê*.

seems there is more real evidence for the common reading that the genetic account prior to 100b4 as a description of the *epagôgê* at 100b4, used to reach and justify principles of demonstration. As *APo.* A.1 at 71a1-11 might be taken to suggest, there may be some cases where a student has *begun* a process of ampliative induction, as per *APo.* B.19, by retaining certain percepts in memory and forming an experience, but needs a teacher to offer a dialectical inductive argument to complete the ampliative induction. But the evidence indicates that the *epagôgê* of *APo.* B.19 in essence *is* (or involves) a process of inductive discovery and justification based on sense perception.

Chapter 3: Responses to Evans and Harari

I. Introduction

Melbourne Evans and Orna Harari each interpret the genetic account of *APo.* B.19 as claiming that *nous* is a faculty that allows one to grasp a universal from the sense perception of just one particular, as per their reading of the “for” clause in Passage C:

[Cb-e]:

...[b] for although[c] the particular is perceived, [d] the perception is of the universal,—[e] e.g. of man, not of Callias the man. (*APo.*, 100a16-b1, trans. Barnes modified¹)

Evans and Harari are not unique in this respect (and we have already seen that Hamlyn also seems to take Passage C as claiming that the sense perception of just one particular is enough to instill the universal in the mind). However, my responses to Evans and Harari are complex in a certain way. For both, my response consists in part, as we will see, in resolving a certain contradictory triad with regard to what Aristotle held:

¹ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” This is done to make the translation more closely reflect the Greek.

- (a) *Epagôgê* is the means of coming to know principles (as indicated by *APo.* B.19).
- (b) *Epagôgê* is a kind of *logos* (as indicated by various texts).
- (c) *Nous*, not *logos*, is the means of coming to know principles (as indicated by the passage from *EN*, 1143a35-b4).²

I will discuss this triad, its relevance to the positions of Evans and Harari, and, in particular, the evidence that Aristotle held (b), in more detail below. As a result of this commonality, and because, as with Hamlyn, it is helpful to clear away their interpretations of the genetic account (insofar as they conflict with my own) *before* presenting my own complete reading of the account, I will consider respond to the positions of both Evans and Harari in this chapter. Then, in Ch.4, I will offer my complete reading of the genetic account.

II. A Response to Evans

As the title indicates, Melbourne Evans' article "Causality and Explanation in the Logic of Aristotle"³ discusses the role of causality in Aristotelian

² Also, my claim is not that Evans and Harari explicitly introduce this triad as a puzzle to be solved (in fact, neither of them do). My claim is that my responses to them in large part, as we will see, consists in resolving this contradictory triad.

³ The article is Melbourne G. Evans, "Causality and Explanation in the Logic of Aristotle," *Philosophy and Phenomenological Research*, Vol. 19, No. 4 (June, 1959), 466-85. Unless otherwise noted, any further reference to a work by Evans will be to this work.

demonstration. When he considers the genetic account in *APo.* B.19, his main conflict with my reading of it pertains to Passage C. Here is the passage again:

[C]

[a] When one of the undifferentiated items makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular [*to kath' hekaston*] is perceived, [d] the perception is of the universal [*tou katholou*],—[e] e.g. of man, not of Callias the man. (*APo.*, 100a14-b1, trans. Barnes modified⁴)

As with Hamlyn, Evans reads Passage C as saying that the sense perception of a single particular is enough to instill the universal subsuming it in one's mind. On Evans' reading, the sense perception is enough for one to reach a universal *truth*. After mentioning the rout metaphor in Ch. B.19, Evans writes:

However, induction for Aristotle is not a matter of mere repetition of experience. Although he speaks of repeated instances of a thing eliciting a knowledge of the universal, still the universal is manifest in its entirety in the particular object: "Though the act of sense-perception is of the particular, its content is the universal—is man, for example, not the man Callias." A single act of perception, therefore, may be all that is required to elicit a universal truth. (Evans, 480)⁵

For Aristotle, according to Evans, repetition of instances is not of any use for introducing (or showing the veracity of) the universal, but is of use to elucidate the universal. Given this, Aristotle recognizes no problem of induction:

⁴ "[T]he particular is perceived" replaces Barnes' "you perceive particulars," and "the perception is of the universal" replaces Barnes' "perception is of universals." This is done to make the translation more closely reflect the Greek.

⁵ Note Evans' translation of a part of Passage C here. I will discuss the correctness of his translation after discussing his reading of the passage. For, as we will see, his translation clearly depends on his reading.

Since the universal is given with the particular, it follows that induction is not a matter of mere enumeration. No repetition of instances can elicit the universal. The repetition can only elucidate, clarify what is already there. Hence the validity of a universal premise is not such that it can be killed by an unhappy particular. The untimely arrival of the traditional black swan is beside the point, and the mortality of man is not tied to the fate of Socrates. (Evans, 484)

Evans provides some support for his reading of Passage C from *APo.* B.2, where, at 90a26ff, Aristotle says (or seems to say) that if we stood on the moon during an eclipse, by just perceiving that the earth is screening sunlight from the moon, we would grasp a universal truth (Evans, 480-1). Evans further cites in a footnote a passage in A.31 (at 88a13ff) where Aristotle says that an act of vision, such seeing light pass through pores in glass (assuming such vision were possible), would be enough to give us the universal generalization that this must happen in all such cases.⁶

Evans recognizes that Aristotle considers particulars to be the objects of sense perception and universals to be the objects of *epistêmê* (Evans, 479-80). If, then, *epagôgê* beyond the survey of one instance is only for the further elucidation, not the justification, of a universal claim, how does one come to know the universal ultimate premises of demonstration with certainty? Evans' answer is that *nous* for Aristotle is rational intuition and allows one to grasp with *certainty* the truth of a universal ultimate premise of demonstration from the sense perception of just one instance (Evans, 481, 484). Evans' support for this

⁶ Evans makes this citation on p. 481, fn. 49.

conception of *nous* (apart from the fact that it would seem to answer the question of how Aristotle thinks the truth an ultimate premise of demonstration could be grasped with *certainty*) comes from the *Nicomachean Ethics*. In *EN* VI.6, Aristotle writes the following:

[H]

...comprehension [*nous*] is concerned with ultimates [*eschatôn*] in both directions; for both the primary definitions and the ultimates are objects of comprehension and not of argument [*logos*], and in demonstrations comprehension grasps the unchangeable and primary definitions, while in practical reasonings [*praktikais*] it grasps the last [*tou eschatou*] and contingent fact, i.e. the second proposition. (*EN*, 1143a35-b4)

Evans, plausibly, takes this passage to state (in part) that the major ultimate premise of a demonstration is obtained by *nous* as rational intuition, and to suggest that the minor ultimate premise of a demonstration is also so obtained (Evans, 481). It is significant that this passage *contrasts nous* and *logos*, lending support for the position that it is not reasoning or argument that provides certainty of the truth of ultimate premises of demonstration, but intuition that does so.

The main conflict between Evans' and my view of induction in the genetic account of *APo.* B.19 pertains to Evans' claim that Aristotle regards *nous* (as intuition) as the means of attaining *certainty* of a universal generalization from sense perception (and so there is no problem of induction for Aristotle). I deny that Aristotle considers *nous* to have such a function. I will thus consider this claim by Evans first. Related to this claim is Evans' view that in Aristotelian

induction, sense perception of just one particular fact is needed to justify a universal claim, and that adducing of particular facts beyond the first serves only to elucidate, not justify, the universal claim. I will consider this claim by Evans second.

Again, the main piece of textual evidence that Evans' relies on for this claim is Passage H. The passage treats *nous* as a faculty and contrasts *nous* and *logos*, suggesting that the function of justifying principles of demonstration belongs not to argument (whether inductive or deductive) but to an intuition that provides the basis of sound argument. There is also an earlier passage in the *Nicomachean Ethics* which suggests *nous* is a *faculty* for grasping principles (*archai*) of demonstration: "...it is comprehension [*noun*] that grasps the first principles [*archôn*]" (EN, 1141a7-8).

This view, taken by Evans, of the function of *nous* implies that for Aristotle, the truth of principles is grasped with certainty by *nous*, not by any *logos*, including any epagogic *logos*.

This, however, comes into conflict with other textual evidence. As I have argued earlier (in Ch. 2 on Hamlyn), the genetic account of *APo.* B.19 describes a process of *epagôgê* based on sense perception for getting to *know* (*gnôrizen*) principles.

Further, there seems to be unassailable evidence that Aristotle regards *epagôgê* as a kind of *logos*. Aristotle apparently regarded the genus of both

sullogismos and *epagoge* to be *logos* in the sense of “reasoning” or “argument.”

Recall the quote from *APr.* A.2 that contains Aristotle’s definition of *sullogismos*:

...a deduction [*sullogismos*] is an argument [*logos*] in which certain things being supposed, something different from the suppositions results of necessity through these things being so. (*APr.*, 24b18-20)

According to that definition, the genus of *sullogismos* is evidently *logos*.

Similarly, consider the passage quoted in that section from *APo.*, 71a5-9. The clause just before it is: “Similarly with arguments [*tous logous*] both deductive [*hoi dia sullogismôn*] and inductive [*hoi di’ epagôgês*]:...” (*APo.*, 71a5-6, emphasis added) This clause strongly suggests that Aristotle regarded *sullogismos* and *epagôgê* as the two main sorts of *logos*.⁷ The passage quoted in Ch. 1 from *Top.*, 105a10-4 similarly suggests that Aristotle regarded *sullogismos* and *epagôgê* as the two main sorts of dialectical *logos*. Finally, the passage quoted in Ch. 1 from *Rhet.*, 1356b12-9 suggests that Aristotle regarded *sullogismos* (as *enthumêma*) and *epagôgê* (as *paradeigma*) as the two sorts of rhetorical *logos*.

Hence, we have a contradictory triad:

⁷ That is, Aristotle seems to divide *logos* into other classes as well, such as demonstrative, dialectical, and rhetorical. But none of these classes seem to extend beyond *sullogismos* and *epagôgê*, (e.g., he does not seem to recognize any dialectical argument that is neither epagogic nor deductive). With regard to the issue of whether one is reasoning to or from the more universal, *epagôgê* and *sullogismos* are the two main species of *logos*.

- (a) *Epagôgê* is the means of coming to know principles (as indicated by *APo.* B.19).
- (b) *Epagôgê* is a kind of *logos* (as indicated by various texts).
- (c) *Nous*, not *logos*, is the means of coming to know principles (as indicated by the passage from *EN*, 1143a35-b4).⁸

I have presented a lengthy argument in defense of (a) (in Ch. 2), and there is much textual evidence for (b). If one seeks to deny (b), the denial seems, in particular, to contradict the passages from *Top.*, 105a10-4 and *Rhet.*, 1356b12-9, both of which, evidently, treat *logos* as the genus of *epagôgê*.⁹

With regard to (c), however, I maintain that we can deny it and that the evidence that Aristotle held (c) can be understood in a way to make it consistent with his holding (a) and (b). My reasons are as follows. After presenting my reasons, I think it will be clear that it is better—more consistent with the textual evidence—to deny (c) in the manner I suggest than (a) or (b).

My denial of (c) consists in denying that “*logos*” in the text used to support (c) has the same sense that it does in (a) and (b). If we take the sense of

⁸ Of these three theses, Evans seems to deny that Aristotle holds (a), but he does not state this explicitly in his paper. Moreover, it is clear that Evans thinks that for Aristotle, *epagôgê* does do *some* work in coming to know a principle: *epagôgê* introduces the universal upon the sense perception of a single instance, and continuing the *epagôgê* (i.e. adducing more instances) serves to elucidate or clarify the universal. But certain knowledge of the *truth* of a universal principle is obtained through *nous*, not *epagôgê*.

⁹ The *Topics* passage seems to be definition of dialectical *epagôgê*, and the *Rhetoric* passage is a description of rhetorical *epagôgê*. But, as both passages treat the kind of *epagôgê* being discussed as a kind of *logos*, the implication is that Aristotle regards *logos* as the genus of *epagôgê* in general.

“*logos*” in (c) as “explanatory account,” (whereas “*logos*” in (b) has the sense of “reasoning”) we no longer have a contradictory triad. And, in *APo.* B.19, there seems to be strong evidence that Aristotle in some contexts uses “*logos*” in the former sense. Consider this argument from that chapter that the principles (*archai*) of demonstration are objects of *nous* (rather than *epistêmê*):

[I]

...the principles [*archai*] of demonstration are more familiar, and all understanding [*epistêmê*] involves an account [*esti meta logou*]. Hence, there will not be understanding of the principles; and since nothing apart from comprehension [*noun*] can be truer than understanding, there will be comprehension of the principles. (*APo.*, 100b9-12)

This passage says that *epistêmê* involves *logos*, or in a more literal translation, that *epistêmê* is with *logos*. Given the conclusion that “there will not be understanding of the principles,” the premise that a state of knowledge with *logos* is not of the principles appears to be tacitly presupposed. Given the last conclusion that “there will be comprehension [*nous*] of the principles,” it is implies that *nous* is not with *logos*. This appears to agree with Passage H, if we take “*logos*” in both passages to have the same sense. But what *is logos* here in Passage I? Given my defense in Ch. 2 of the view that, according to *APo.*, B.19, the principles of demonstration are grasped by *epagôgê* based on sense perception, i.e. that (a) is true, and given all of the evidence that Aristotle held (b) (where “*logos*” is reasoning or argument”), it is not plausible that *logos* in Passage I is reasoning or argument. For evidently Aristotle thinks the principles (in the

sense of ultimate premises) *are with* (i.e., are the results of epagogic) reasoning. Given Aristotle's view that *epistêmê*—demonstrated knowledge—involves an explanation provided ultimately by the principles (in the sense of ultimate premises), what *is* plausible is that *logos* in Passage I is an explanatory account (in the sense of being an ultimate premise of demonstration).¹⁰ For, if such is the sense of “*logos*” in Passage I, then the claim that *epistêmê* is with *logos* and the implication that *nous* is without *logos* are hardly surprising for Aristotle to make. But the claim and the implication are surprising—they seem to be contradicted by textual evidence—if we take “*logos*” in Passage I as reasoning or argument.

We can find corroborating evidence for the former sense of *logos* in Passage I within the genetic account of *APo.* B.19 itself. Within that account of how we come to know the principles of demonstration, Aristotle states:

...some [animals] can still hold percepts in their soul after perceiving them. When this occurs often, there is then a further difference: some animals come to have an account [*logon*] based on the retention of these items, others do not. (*APo.*, 99b39-100a3)

A little later in the genetic account, Aristotle states the following:

...from experience, or from all the universal [*tou katholou*] which has come to rest in the soul (the one apart from, i.e. whatever is one and the same in all these items), there comes a principle [*archê*] of skill [*technês*] or understanding... (*APo.*, 100a6-8)¹¹

¹⁰ Hence, Barnes' translation of “*logou*” as “account” appears to be correct.

¹¹ This passage is a part of Passage E, presented in Ch. 2.

This passage appears to be part of an attempt to explain in greater detail the passage at 99b39-100a3 (and what is stated just before it). If we take “*archê*” in this passage as a principle in the sense of an ultimate premise of demonstration (or reasoning in *technê*, as the passage suggests), and the same as the *logos* mentioned in the passage at 99b39-100a3 and Passage I, it helps to make all three passages coherent. A principle (in the sense of an ultimate premise) of demonstration *is* a *logos* (an “explanatory account” for demonstrated knowledge), but does not *have* a *logos*. And as the state of *nous* consists in comprehending such principles (based on sense experience), it is without, i.e. not based on, such *logos*. But *epistêmê*, which is founded on the principles, *is* with such *logos*.¹²

Thus, the evidence that Aristotle holds (c) need not be interpreted in a way that would make it contradict (a) and (b).

We can now return to the question of whether Aristotle regards *nous* as direct, rational intuition (as Evans thinks he does) that allows a person to know with certainty the truth of a principle of demonstration, thus allowing Aristotle to “solve” (or avoid) the problem of induction.

Passage H and the passage from *EN*, 1141a7-8 suggest that *nous* is a faculty for coming to know principles. However, *APo.* B.19, appears to explicitly regard *nous* as the *state* of knowing the principles (and *epagôgê* based on sense

¹² Thus, it seems that “*logos*” in Passage H is better translated as “an account” rather than as “argument.”

perception as the means).¹³ Combining these statements from the *Nicomachean Ethics* with *APo.* B.19, the following picture seems to result. *Nous* in *APo.* B.19 is the state (but not the process) *by* which we know principles. It is a state which is innate in the sense of being a certain innate faculty (*dunamis*, capacity, potentiality), namely sense perception.¹⁴ As this faculty is *used*, *nous* comes to consist in cognitive content (percepts, experiences, and principles of demonstration) and in capacities beyond sense perception (such as the faculty of experience-formation). Since the faculty of *nous* builds on (and thereby becomes more than) the faculty of sense perception, since it comes to include actual cognitive content, it is the faculty of providing the principles (*archai*) for *epistêmê* (demonstrated knowledge). But *nous* is not the *process* by which we know principles. The process performed by *nous*, the answer to the first of the two questions at the beginning of *APo.* B.19, is *epagôgê* based on sense perception. This is a picture that resolves the conflict between the claim of *APo.* B.19 that *nous* is the state of knowing the principles (which evidently, again, is the answer to the *second* of the two questions) and the passages in the *Nicomachean Ethics* which imply that *nous* is a faculty.

¹³ As I mention in Ch. 2, at the beginning of *APo.* B.19, Aristotle asks the questions of how we come to know the principles and what the knowing state is, and says "...this will be plain from what follows..." (*APo.*, 99b18-9). And Passage A (presented in Ch. 2) at 100b3-5 evidently gives *epagôgê* (that is based on sense perception) as the answer to the first question, and the passage about states of knowledge at 100b5-17 evidently gives *nous* as the answer to the second question.

¹⁴ In *APo.* B.19 at 99b35-6, Aristotle states that all animals (and, by implication, humans) are born with a faculty (*dunamis*, potentiality), namely sense perception.

Given this, the textual evidence that Evans cites to support his claim that *nous* for Aristotle is intuition that allows one to grasp with certainty a universal truth from the sense perception of just one particular fact is suspect. Clearly, there is textual evidence that Aristotle, in some way, considers *nous* to be a faculty, and not just a state. But, as I have indicated, the way in which Aristotle seems to consider *nous* to be a faculty is as a state which is a potentiality (faculty) of performing sense-based *epagôgê* to grasp principles of demonstration. The result is *nous* the state which, in addition to being a *potentiality* (of sense perception, memory, etc), consists in *actual* cognitive content. Given the sense of “*logos*” as reasoning in general, there is hardly any good evidence to think Aristotle contrasts *nous* and *logos* in *this* sense. Hence, the fact that Aristotle takes *nous* to be a faculty (not just a state) cannot by itself be taken as evidence that he takes it as non-inferential intuition that solves (or allows one to avoid) the problem of induction.

Evans’ additional piece of evidence for his conception of *nous* is that it would explain how Aristotle could think that one can *secure* from sense perception general principles that are ultimate premises of demonstration. But, in the absence of good textual evidence for that conception, there is a problem with this additional piece of evidence. Further, in Chapters 4, 5 and 7, I will offer and defend my view how Aristotle thinks we *can* secure such ultimate premises from sense-based induction and without an appeal to *nous* as certifying intuition.

Let us now turn to Evans' claim that *epagôgê* for Aristotle, insofar as it extends beyond one instance, is for elucidation, not justification. This claim, if true, would lend some credibility to the claim that Aristotle regards *nous* as intuition that allows one to grasp with certainty a universal truth from sense perception. For it seems that in most cases, it is hardly plausible that the sense perception of a single instance of a general proposition is enough to *secure* the truth of the proposition.

I do not seek to deny here that Aristotle might in some contexts treat *epagôgê* as only for elucidation. What I deny is that every instance of *epagôgê* for reaching a principle of demonstration seeks to justify the general conclusion on the basis of the sense perception of just one fact.

Again, Evans' main evidence for this position of his is a passage he cites from the *Posterior Analytics* about standing on the moon seeing the earth screen sunlight from the moon:

[J]

That the search is for the middle term is shown by those cases in which the middle is perceptible. If we have not perceived the middle term, we seek it: e.g. we seek if there is a middle term for the eclipse or not. But if we were on the moon we would seek neither if there is an eclipse nor why there is: rather, these things would be plain at the same time. By perceiving we would come to know the universal: perception would tell us that the earth is now screening it (it is plain that it is now eclipsed); and from this the universal would come about. (*APo.*, 90a24-30)

Again, Evans takes this passage to support his claim that Aristotle thinks that the sense perception of only a single particular fact is needed to reach a universal truth. (Note the last statement in the passage: "...from this the universal would come about.") To determine whether this passage should be taken as evidence for such a claim, we need to consider another passage from a few chapters earlier (specifically, Ch. A.31):

[K]

Particulars must be perceived, whereas we have understanding [*epistêmê*] insofar as we get to know universals.^[15]

This is why, if we were on the moon and saw the earth screening it, we would not know the explanation of the eclipse. We would perceive that it is now eclipsed, but not why; for we have seen that there is no perception of universals. Nevertheless, if we observed this happening often and then hunted for the universal, we would possess a demonstration; for it is from many particulars that the universal becomes plain. (*APo.*, 87b37-88a5)

Passage J, at least on Evans' reading, seems to contradict Passage K. Passage K seems to say that, while standing on the moon and seeing the earth screen the sunlight from it, we cannot know the universal causal truth that the earth's screening sunlight from the moon causes a lunar eclipse, unless we saw, from the moon, many more instances of this screening. Passage J, however, seems to say

¹⁵ A translation of this "whereas" clause that more literally captures the OCT text is: "...whereas understanding is to know the universal." See Barnes' fn. 27 on this in Barnes (2002), 43.

that, while standing on the moon, seeing this screening just once would be enough for us to reach that universal causal truth.¹⁶

In response to this apparent contradiction, one might be tempted to read Passage J and/or K in a way that makes them mutually consistent. One might attempt this by reading Passage J as about middle terms that are particulars as examples of middle terms that are directly perceived, and Passage K as about universal explanations. However, what seems to stifle any attempt to resolve the apparent contradiction is the last sentence of Passage J. If the clause “from this” (*“ek...touto”*) in that sentence were instead “from this kind of thing” or “from these,” or something similar, we could read that sentence as saying that “the universal comes about” from sense perceptions of multiple particulars. This would help make Passage J consistent with Passage K’s claim that “it is from many particulars that the universal becomes plain” and that many sense perceptions from the moon are required to grasp the universal truth about the eclipse. However, as the last sentence of Passage J stands, such reconciliation seems impossible to perform while staying true to the text.

¹⁶ Apparently, Passage K is saying, in addition, that once the causal truth that a lunar eclipse is caused by the earth screening the sunlight from the moon is reached, it will serve as one of the premises of a demonstration. Passage J, on the other hand, seems to treat that causal truth as an example of a definition (in this case, lunar eclipse is being defined). This is indicated by the fact that the material above Passage J at 89b21-90a24, and specifically at 90a15-6 (which says that in certain cases what a thing is same as why it is) suggests that Passage J is concerned with finding out what a lunar eclipse is. However, the fact that the two passages appear to have different concerns does not erase the appearance of a contradiction between them.

However, even if the two passages cannot be read as entirely consistent with each other, Passage J still does *not* seem to provide the evidence that according to Aristotle, the sense perception of only a single particular is needed to grasp a universal truth. To see this, we need to consider what comes shortly after the earlier passage, Passage K. Passage K, right after describing how the universal truth about the eclipse is reached, ends with the clause: "...for it is from many particulars that the universal becomes plain." In the same chapter as Passage K (Ch. A. 31), shortly after that passage, Aristotle writes the following:

[L]

Thus it is clear that it is impossible to understand anything demonstrable by perceiving it—unless you say that possessing understanding through a demonstration is perceiving.

Nevertheless, certain features in problems are referred to want of perception. In some cases if we saw we should not seek—not because we have knowledge [*eidotes*] by seeing but because we grasp the universal from seeing. E.g. if we saw the glass to be perforated and the light coming through it, it would be plain why it does—even if we saw each piece of glass separately whereas we think at a single time that it is thus in every case. (*APo.*, 88a9-17)

What *exactly* this passage is claiming, and its exact relation to Passage K, is not clear. However, we should first note that the statement after "unless you say that" presents what is, for Aristotle, a falsehood. For, earlier in this chapter, Aristotle states that "[y]ou cannot understand anything through perception" (*APo.*, 87b28). A little later, Aristotle says that

...it is clear that you cannot understand anything through perception. Rather, it is plain that even if we perceive that triangles have angles equal to two right angles, we would still seek a demonstration and would not, as some people say, already understand it. (*APo.*, 87b33-7)

Note also the first sentence of Passage K, which follows this passage. Hence, it is clear that Aristotle intends the statement following “Thus” in Passage L to be true.

Second, whatever is the exact, correct reading of Passage L, it appears to make an exception—or certain exceptions—to Passage K’s claim that “it is from many particulars that the universal becomes plain.” If we could see a single particular instance of light passing through pores in glass, Passage L seems to say, we would grasp the universal explanation of why glass is transparent.

As stated earlier, Evans cites the second part of Passage L as evidence that Aristotle considers the sense perception of a single particular fact as sufficient to reach with certainty a universal truth. However, again, if Passage L is considered in the context of what comes before it, including Passage K, it appears to be making a kind of *exception* to the rule that “it is from many particulars that the universal becomes plain.”

Evans might want to read L as saying that the sense perception of one particular fact is enough to grasp and fully *justify* a universal truth, and Passage K as saying that many particular facts are needed to *elucidate* a universal truth. In other words, Evans might read Passages L and K as each concerned with two different kinds of epistemic goals (the former with justification, the latter with

elucidation). However, the texts of and surrounding those two passages do not seem to make any such distinction in the way that Evans needs.¹⁷ The chapter of those two passages, *APo.* A.31, and the immediately previous chapter, A.30 (discussed in my Ch. 2 on Hamlyn) are evidently about the perceptual basis of demonstration, and hence, about justification. Further, both passages discuss reaching the universal in terms of it becoming “plain” (“*dêlos*”). Passage K says: “...it is from many particulars that the universal becomes *plain*.” (Emphasis is added.) Passage L says: “...if we saw the glass to be perforated and the light coming through it, it would be *plain* why it does...” (Emphasis is added.) If the two statements are concerned with two different *kinds* of epistemic goals, it is extremely unclear of Aristotle to describe the universal in *both* statements as becoming *dêlos*. This rather suggests that in each of the statements, he has the same kind of epistemic concern in mind.¹⁸

Still another reason to consider both Passage K and L to be concerned with the same kind of epistemic goal is that this will help us reconcile Passage K with the later Passage J. If we consider Passage J to make an exception to Passage

¹⁷ In fact, if the two passages *do* appear to suggest such a distinction, it would seem that it is Passage *J*, the passage apparently about the perception of a single particular fact being enough, as being about elucidation. Consider this sentence from Passage J: “Nevertheless, certain features in problems are referred to want of perception.” One might try to read this sentence as shifting the concern to elucidation or clarification.

¹⁸ Nor does the use of “*dêlos*” in both statements indicate that he is concerned with elucidation (as against justification) in both statements. For it is far from clear that the word “*dêlos*” refers to lucidity as distinct from the state of being justified. And as I have argued, both Ch. 30 and 31 (the chapter of both Passages K and L) are evidently about justification.

K, to say that there are certain cases where we can reach the universal through the sense perception of a single particular,¹⁹ we can consider Aristotle in Passage J to merely be changing his mind about the lunar eclipse *example*. Given this reading, Aristotle is not in Passage K necessarily *serious* that one cannot while standing on the moon grasp the universal cause of a lunar eclipse by perceiving a single instance of the earth screening sunlight from the moon. He is merely using that claim as an off-hand *example* of the principle that usually “it is from many particulars that the universal becomes plain.” In Passage J, given this reading, the lunar eclipse example is now used as an example of the *exceptional* kind of cases. He seems to say that standing on the moon, seeing a single instance of the earth screening the sunlight from the moon is enough to grasp the universal cause of a lunar eclipse. But, again, this claim is being used as an *example*; Aristotle is not necessarily convinced of its truth.²⁰ The upshot is that, on this reading, Passages K and J do not contradict one another. Both agree on the principle that usually “it is from many particulars that the universal becomes plain.” One passage merely uses the lunar eclipse scenario as an example of the *rule*; the other modifies it to use it

¹⁹ Barnes (2002), 194, reads the beginning of the second paragraph of Passage J as saying that although perception is not *sufficient* to grasp the universal cause, it is *necessary*. However, the Part of Passage J beginning with “if we saw we should not seek...” also suggests that there are certain cases in which a single perception is enough for us to grasp the universal cause.

²⁰ It is hard to say which of the two example-providing claims Aristotle would consider true. It seems as though he must consider one and only one to be true. Charity would suggest the former, since, if the question is the cause of a lunar eclipse, there does not seem to be any way to know, from just one observation while on the moon, that it is always the *earth* screening the sunlight that is the cause of a lunar eclipse.

as an example of an *exceptional* kind of case. Given my prior argument that the example-providing claims of Passages K and J do not seem to be reconcilable, this seems to be the most coherent reading of Passages K, L, and J. And, with this reading, we have, it seems, two sound criticisms of Evans' view: (1) as argued earlier, Evans would not seem to be justified in taking Passage K as about the *elucidation* (as against justification) of a universal claim through the sense perception of many particular facts, but taking Passage J as about the *justification* of a universal claim through the sense perception of a single particular fact. Again, both passages, it seems, are about justification.²¹ (2) Evans does not seem to be justified in taking Passages L and J as evidence that Aristotle regards a single perception of a fact to always be sufficient to fully justify a universal claim. Again, our reading indicates that for Aristotle, this is the exception rather than the rule.

Thus, as I have argued in the last chapter on Hamlyn, it seems that contrary to Evans, we are not justified in reading Passage C as claiming that the sense perception of just one particular fact is enough to secure the truth of a universal claim.²²

²¹ However, they are not necessarily not *also* about elucidation; Aristotle might consider the perception-based justificatory process to also be an elucidating process.

²² See, in particular, Ch. 2, Section IV, where I indicate that an earlier part of the genetic account suggests that *many* percepts are needed for form an experience, and that from this a universal and a propositional principle of demonstration is obtained.

In conclusion, Evans does not appear to be justified in his view that for Aristotle, induction of a universal claim based on the sense perception of a single particular fact, through the use of *nous* as certifying rational intuition, secures the truth of the claim. The claim that *nous* for Aristotle is certifying rational intuition is highly suspect. And, though Aristotle may think there are cases where one can generalize with certainty from the sense perception of a single fact, it appears that he thinks that such cases are the exception and not the rule. As a result, Evans' translation of the Greek for the clause Cb-e does not seem to be correct. His translation, again, is:

Though the act of sense-perception is of the particular, its content is the universal—is man, for example, not the man Callias. (*APo.*, 100a16-b1, trans. Evans in Evans, 480)

The Greek for this passage is:

kai gar aisthanetai men to kath' hekaston, hê d' aisthêsis tou katholou estin, hoion anthrôpou, all' ou Kalliou anthrôpou... (*APo.*, 100a16-b1)

Evans' translation of this passage does not closely reflect the Greek. (There is, for example, no Greek word or phrase in the passage for “content.”) And given my criticisms above of Evans' view of Aristotelian induction, Evans' translation of this passage does not appear to be justified. For, as I argue, this passage should not be read as claiming that the sense perception of a single particular fact is sufficient to secure the truth of a universal claim. My modification of Barnes' translation much more closely reflects the Greek:

[Cb-e]

...for although the particular is perceived, the perception is of the universal,—e.g. of man, not of Callias the man. (*APo.*, 100a16-b1, trans. Barnes modified)

As such, my modification of Barnes' translation of this passage is preferable to Evans' translation.

III. A Response to Harari

Orna Harari in *Knowledge and Demonstration*²³ presents a view of induction in the acquisition of principles (as presented in *APo.* B.19) similar to that of Evans. I will respond to Harari's view insofar as it conflicts with my own.

First, Harari appears to think that *APo.* B.19 is about the acquisition of concepts as against propositions (Harari, 19-20, 30). She makes a distinction between apparently inductive processes described in *Met.* A.1 and *APo.* B.19:

...the identity between these two processes does not hold for their results. The process described in *Metaphysics* I.1 leads to universal judgments, such as "this medicine has done good to all persons", whereas in the *Posterior Analytics* II.19 the process leads to universal concepts such as "man" or "animal". (Harari, 19-20)

Harari further corroborates her claim by noting that Aristotle in *APo.* B.19, with its question of how principles come to be known, is concerned about the paradox

²³ Orna Harari, *Knowledge and Demonstration: Aristotle's Posterior Analytics* (Dordrecht, Netherlands: Kluwer Academic Publishers, 2004). Unless otherwise noted, any further reference to a work by Harari will be to this work.

in *Meno*, and Plato's *Meno* is clearly about the knowledge of universal ideas (concepts), not propositions (Harari, 30).

For my response to this position, please note the textual evidence I have pointed out (in my response to Hamlyn in Ch. 2) that the genetic account in *APo*. B19 is about the acquisition of both concepts and correlative propositional truths. Clearly, *APo*. B.19 is about reaching concepts like man and animal. However, the fact that Aristotle's explicit examples in that chapter of items reached are man and animal does not clinch the case that the chapter is concerned with the acquisition of concepts *as against* that of propositional truths. Yet that is what Harari seems to think in making her distinction in the quote above between *APo*. B.19 and *Met*. A.1.

Turning now to Harari's corroborating evidence from the *Meno*, we should note that that work and its paradox are not about the acquisition of concepts *as against* that of propositional truths. It is evidently about both. Consider, for example, when Socrates asks initially at 71d2ff what virtue is. Socrates and Meno are, in some sense, seeking to grasp or understand or clarify a *concept*—virtue. But the answer to Socrates' question would be a *proposition* of the form: "Virtue is P." Further, when Socrates interrogates Meno's slave boy, the paradox that Socrates, in effect, introduces is that learning presupposes that one lacks the knowledge that one is seeking to learn—but that to lack this knowledge is not to know what one is seeking. Hence, learning is impossible (if one does not

know what one is seeking) or it is unnecessary. Socrates' solution is that knowledge, or even true opinion, does not come from learning but from recollection. (See *Meno*, 81e6-86a2.) Socrates' questions are about concepts such as square or triangle, but the slave boy's answers to his questions are, in effect, *propositions*.

In short, Harari's claim that "the intellect [*nous*] grasps essences and not judgments" (Harari, 37) does not appear to be true for Aristotle, just as it does not appear to be true for Plato. For both, it seems, the grasp of an essence occurs correlatively with the grasp of a propositional truth.

Second, Harari claims that for Aristotle the grasp of principles (which in her reading are just concepts) is not through reasoning. Harari claims that the *epagôgê* employed in the grasp of a principle is not an argument or an inference (Harari, 20-1, 24-5). Recall the contradictory triad introduced in connection with my criticism of Evans' view:

- (a) *Epagôgê* is the means of coming to know principles (as indicated by *APo.* B.19).
- (b) *Epagôgê* is a kind of *logos* (as indicated by various texts).
- (c) *Nous*, not *logos*, is the means of coming to know principles (as indicated by the passage from *EN*, 1143a35-b4).

My view, again, is that we can and should deny (c), if we take "*logos*" in (c) to have the same sense that it has in (b). By contrast, Harari's view is that we should

deny (b). Her view is that *epagôgê* in coming to know principles is not a kind of *logos* (Harari, 20-1).

Harari adds, as a reason in support of her view, the following:

In *Posterior Analytics* II.19 Aristotle characterizes knowledge [*epistêmê*] as accompanied by inference (*meta logou*), arguing that there is no knowledge [*epistêmê*] of the first principles (100b10-11). Although Aristotle in this passage does not explicitly claim that the cognition of first principles by the intellect [*nous*] is not argumentative, the distinction between knowledge [*epistêmê*] and intellect [*nous*] implies that this is one of the characteristics that distinguish these two mental states. (Harari, 20)

Harari's claim here (along with Passage H from the *Nicomachean Ethics*) seems to support (c) from the contradictory triad.

Harari's second additional reason for denying (b) is that it would make sense of *epagôgê* discussed in *APo.* B.19 as a means of reaching universal concepts rather than justifying propositions. For, as we have seen, she thinks that chapter is concerned with reaching *concepts* and not propositions. And, she thinks that "argumentative induction does not form content but justifies already given content" (Harari, 24).²⁴

With regard to Harari's first additional supporting reason, I do not think that her reading of the passage at *APo.*, 100b10-1 as saying that *epistêmê* is accompanied by inference (with the implication that the principles are not reached

²⁴ Harari's view is that the *epagôgê* discussed in *APo.* B.19 consists in grasping the form of an ultimate particular, and hence grasping the universal predicate, the "what it is," under which the particular falls. *Epagôgê* in this use is not an argument and is solely for acquisition (of concepts), not for justification. See Harari, 24-30.

by inference) is correct. For as I have argued in Section II on Evans above, a better way of reading that passage is as saying that *epistêmê* is accompanied by *logos*, where *logos* here should be understood as an *explanatory account*. The implication is that a principle does not have an explanatory account. As I have argued above, it is more plausible to deny (c) (assuming “*logos*” in (c) has the sense of “reasoning”) rather than (b).

But in order to plausibly deny (c), we also need to counter Harari’s second additional supporting reason. I will note again that I have provided evidence in Ch. 2 that the genetic account of *APo.* B.19: that it concerns our coming to know concepts and correlatively of certain propositional truths, not of one or the other alone. Given this, Harari’s premise that “argumentative induction does not form content but justifies already given content” does not seem as though it is correct. For induction in coming to know a truth (as a truth) would consist also in justifying (not just grasping) the conclusion. And, it would be an argument, since there would be premises (such as this is an emerald and is green, that is an emerald and is green, etc.) and a conclusion. The argument may not be one that is *fully articulated*. The particular premises would likely only be *implicit* in sense perceptions (and this, it seems, is the kind of *epagôgê* discussed in *APo.* B.19). Further, the inducer may not be self-consciously aware that his mind is engaged in argument. However, it is implausible to think that for Aristotle (and indeed for most of us) not being aware of what something is changes what it is.

This seems to discredit Harari's second additional reason for denying (b). The sole reason left is that the denial of (b) would resolve the contradictory triad. But without the two additional supporting reasons, my argument above that it is most plausible to deny (c) to resolve the contradictory triad still stands.

Harari's third point of conflict with my view is her view that the genetic account of *APo.* B.19 is not concerned with methodology or justification. Noting that near the beginning of that chapter Aristotle asks how one comes to know the principles and what the state of knowing them is, she gives (what she takes as) Aristotle's answer to the first:

[M]

Thus the states neither belong in us in a determinate form, nor do they come about from other states that are more cognitive; but they come about from perception... (*APo.*, 100a10-11, trans. Harari in Harari, 30)

In connection with this as the answer to Aristotle's first question, Harari argues:

In this passage Aristotle reiterates his answer to how the first principles become known [*gnôrimoi*]. It indicates that this question does not concern a method or process of concept acquisition. Maintaining the correlation between Aristotle's question and answer, it seems that the question: "How do the first principles become known [*gnôrimoi*]?" is to be construed as equivalent to the question of whether knowledge [*gnôsis*] of the first principles is innate. Indeed, this question is phrased explicitly in the second paragraph of the *Posterior Analytics* II.19, where Aristotle asks "whether the states are not present in us but come about in us, or whether they are present in us but escape notice" (99b25-26). (Harari, 30)²⁵

²⁵ By her claim in this quote that Aristotle's answer in Passage M to his question of how we come to know the principles "does not concern a method or process of concept acquisition," Harari appears to mean the following. While the genetic account *is* about concept acquisition, Aristotle's

Harari is surely correct to think that Aristotle's first question in some way concerns whether the principles are innate or acquired, for *APo.* B.19, and especially the evidence from it that she herself cites, makes this inescapable. What I disagree with is her claim that the first question should be understood as *equivalent* to the question of whether the knowledge of the principles is innate. As others point out, one who is asking how one comes to know principles that are "truer" and "more exact" than what is demonstrated, as the *foundation* of what is supposed to be a kind of unshakeable knowledge (*epistêmê*), is apt to be concerned about the *justification* of the principles.²⁶ Further, to repeat an observation from Ch. 2, Aristotle's suggestion at *APo.*, 99b28-30 that the grasp of the principles (like all knowledge) must in some way rest on pre-existing knowledge further suggests that Aristotle has in mind the question of what *supports* (i.e. justifies) the principles.²⁷ Indeed, the question of justification, it seems, is implicit in the very question of how one comes to *know* the principles.²⁸

Thus, it is hardly plausible to take the question quoted at the end of the quote from Harari above as *equivalent* to and an explicit rephrasing of the first

question before it about how we come to know the principles is asking whether the principles (i.e., concepts) are innate or not, not what the specific *method* or *process* of acquiring them is.

²⁶ Again, see, for example, Bayer, 112, fn. 8.

²⁷ Again, see Bayer, 112.

²⁸ Again, see Bayer, 112.

question of *APo.* B.19. The former is better understood as a major (perhaps *the* major) subsidiary question of the latter.

Again, given my reading of the genetic account, Aristotle's answer to the first question of *APo.* B.19, the question of how one comes to know the principles, is *epagôgê* based on sense perception.^{29, 30}

Harari's last point of conflict with my view concerns her reading of Passage C, a reading which is similar to that of Hamlyn and Evans. Passage C, again, is:

[C]

[a] When one of the undifferentiated items makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular [*to kath' hekaston*] is perceived, [d] the perception is of the universal [*tou katholou*],—[e] e.g. of man, not of Callias the man. (*APo.*, 100a14-b1, trans. Barnes modified)

Harari's reading of this passage is based on her peculiar and closely interrelated conceptions of "perception" ("*aisthêsis*") and "induction" ("*epagôgê*") in *APo.* B.19. According to Harari, there is a sense of "perception" (which she calls "inductive perception") in that chapter that is intellectual (i.e. *nous*-performed)

²⁹ Hence Harari's conclusion in Harari, 36 that *epagôgê* in *APo.* B.19 is not a process of justification seems incorrect.

³⁰ Harari has a view of Aristotelian *epagôgê* in *APo.* B.19 that is different from my own. See fn. 24 and Harari, 35. This view, however, depends on her view that principles in *APo.* B.19 are concepts and not propositions, and that this is what that chapter is concerned with. However, I have already criticized the latter view. Passage A (presented in Ch. 2, Section I) from the genetic account (in connection with my criticism in Ch. 3 of Hamlyn's view of the role of *epagôgê* in the genetic account) seems to make clear that the genetic account *is* a description of the *epagôgê* used to acquire knowledge of a principle.

perception rather than sense perception (Harari, 34-5). As a result, Harari thinks that the term “perception” (“*aisthêsis*”) in the statement Cd that “perception is of the universal” has a different sense from “perception” whose object is a particular (which is the sense of “perceived” in statement Cc). The sense of statement Cc is sense perception; the sense of statement Cd is “inductive perception” (Harari, 31-2). “Inductive perception” consists of *nous* grasping, in the sense perception of a particular, the universal form of that particular (Harari, 34-5). Harari evidently thinks that the sense perception of a single particular is always all that is needed for the “inductive perception” of the universal form (Harari, 32-3). Obviously, this reading of Passage C conflicts with my own.

Her argument for this is essentially in three parts.

She first argues that Aristotle recognizes a sense of “induction” that is like perceptual recognition, such that, upon the sense perception of a triangle, one grasps that it is a triangle. For textual evidence, she refers to the passages in *APo*. A.1 (at 71a17ff) and *APr*. B.21 (at 67a21ff) that suggest something like the perceptual recognition of a triangle as having angles equal to two right angles, and suggest that this is *epagôgê* (Harari, 25-30).

To answer the question of how *epagôgê* that is like perceptual recognition would fit Aristotle’s description of it as an advance from the particular to the universal, Harari appeals to *Met. Z.17*. There Aristotle discusses questions like “Why is this a statue?” and “Why is this a house?” Apparently, Aristotle thinks

that such questions are about formal cause or explanation and amount to: “Why is this mass of bronze a statue?” and “Why is this collection of wood, metal, and concrete a house?” The answers to such questions would be: because the mass of bronze, or the collection of wood, metal, and concrete, has a certain shape and structure (i.e., a certain form).

Harari thinks that here, in *Met.* Z.17, Aristotle is discussing a process of cognition that consists in recognizing the universal form of a collection of matter (such a bronze, or a mix of wood, metal, and concrete) upon perceiving that collection with one’s senses (Harari, 27-8). Harari thinks that this is a type of *epagôgê* for Aristotle that is non-argumentative. She thinks that this is the sort of *epagôgê* Aristotle has in mind in the passages in *APo.* A.1 and *APr.* B.21 (Harari, 27-30). And, she thinks it fits Aristotle’s description of advancement from the particular to the universal since it consists in advancing cognitively from the sense perception of a particular parcel of matter to the recognition of a universal form (Harari, 29-30).

For the second stage of her argument, Harari argues that Aristotle upholds a certain kind of perception which is not sense perception and which she calls “inductive perception.” These “inductive perceptions” consist in “induction” in the sense that she claims in the first stage of her argument that Aristotle upholds. She thinks that the “inductions” (*epagôgai*) in the passages in *APo.* A.1 and *APr.* B.21 involve this inductive perception. To support this claim, she relies on a

passage in the *Nicomachean Ethics* that she takes to imply that there is a sort of perception that is not sense perception, but intellectual (i.e., *nous*-performed) perception:

[N]

...practical wisdom [i.e., “*phronêsis*” at 1142a23] is concerned with the ultimate particular [*tou eschatou*], which is the object not of knowledge [*epistêmê*], but of *aisthesis* [perception]—not *aisthesis* of qualities peculiar to each sense but *aisthesis* akin to that by which we perceive [*aisthanometha*] that the particular figure before us is a triangle. (*EN*, 1142a26-9, trans. Harari in Harari, 32)

Based on this, for the third stage of her argument, she thinks that, in Passage C, the statement Cc that “the particular is perceived” is about perception of a different kind than the perception mentioned in the statement Cd that “the perception is of the universal.” The first statement is about sense perception. But the second is about inductive perception. Hence, in Harari’s reading of Passage C, the sense perception of a single particular collection of matter (such as Callias) is enough for one to “inductively perceive” its universal kind (such as man). And, she thinks that this sense of “induction” (“*epagôgê*”), the sense she thinks occurs in the passages in *APo.* A.1 and *APr.* B.21, is the sense used in *APo.* B.19.

I will now turn to my response to this three stage argument.

In the first stage of her argument, her interpretation of *Met.* Z.17 relies on her acceptance (in the contradictory triad) of the claim that (c) *nous*, not *logos*, is the means of coming to know principles and her rejection of the claim that (b)

epagôgê is a kind of *logos*. It also relies on her view that *APo.* B.19 is about the acquisition of concepts and *not* propositions. I have already criticized these two positions. When we add to this the fact that there is no inflection of “*epagôgê*” found in *Met.* Z.17, it is not plausible that that chapter is about *epagôgê* or some kind of *epagôgê*. It is evidently about explanation, or, more exactly, certain questions of the form: Why is S P? There is no indication there that in answering a question like “Why is this mass of bronze a statue?” Aristotle thinks some kind of *epagôgê* is necessarily involved, nor, in particular, that Harari’s notion of “inductive perception” is involved.

Without Harari’s reading of *Met.* Z.17 and the two premises (about the contradictory triad, and about concepts as against propositions as the subject of *APo.* B.19) on which it is based, it is very unlikely that the passages in *APo.* A.1 and *APr.* B.21 are about induction in the sense of *grasping* a universal form in the sense perception of a particular. Rather, it seems as though inflections of “*epagôgê*” in those two passages have one of two meanings. There is some indication that the meaning is a non-technical one, a “leading on,” in which one is led *deductively* to a conclusion (this seems to be Ross’ view³¹). The second possibility is that there is *epagôgê* in the technical sense of reasoning from the

³¹ See Ross (Ross, 476). Given that both the passages in *APo.* A.1 and *APr.* B.21 are explicit considerations and attempted solutions to the puzzle in the *Meno*, it is perhaps plausible that Aristotle’s uses of “*epagôgê*” (or its inflections) here are simply in the non-technical sense of the “leading on” that occurs in the *Meno* dialog.

particular to the universal. This would consist of moving from a recognition of the fact that this is this (i.e., that a particular that one perceives is itself) to a recognition of the fact that this is a triangle.³² The first fact is particular; the second is universal in the sense of having a universal predicate. Such “reasoning” would establish the minor premise of the deduction that this has angles equal to two right angles.

With regard to the second stage of Harari’s argument, consider again the passage from the *Nicomachean Ethics* that she relies on:

[N]

...practical wisdom [i.e., “*phronêsis*” at 1142a23] is concerned with the ultimate particular [*tou eschatou*], which is the object not of knowledge [*epistêmê*], but of *aisthesis* [perception]—not *aisthesis* of qualities peculiar to each sense but *aisthesis* akin to that by which we perceive [*aisthanometha*] that the particular figure before us is a triangle. (*EN*, 1142a26-9, trans. Harari in Harari, 32)

Passage N does appear to suggest that we have a kind of perception that is different from sense perception. A closer examination, however, will reveal that this passage does not provide evidence that Aristotle thinks that we have intellectual, *nous*-performed perception. To see this, we need to consider Passage N with the sentence fragment just prior to it:

³² Note that such recognition is different from Harari’s “inductive perception,” which could consist of grasping, for the first time, the concept triangle from the sense perception of a single triangle. “Inductive perception” is not exactly the perceptual recognition which consists (for example) of applying the concept triangle, *which one already has*, to this figure. My description of a cognitive move from recognition of a particular to a universal fact is also intended to fit the definition of *epagôgê* as a sort of *logos*, for Aristotle could arguably see this move as a *logos*, though clearly not a deductive *logos*. Thus, in this respect it also differs from “induction” in “inductive perception,” which is supposed to be *alogon*, and hence non-technical, sort of *epagôgê*.

[N with prior sentence fragment]

It [i.e., “*phronêsis*” at 1142a23] is opposed, then, to comprehension [*nôî*]; for comprehension is of the definitions, for which no reason [*logos*] can be given, while practical wisdom [i.e., “*phronêsis*” at 1142a23] is concerned with the ultimate particular [*tou eschatou*], which is the object not of knowledge [*epistêmê*], but of *aisthesis* [perception]—not *aisthesis* of qualities peculiar to each sense but *aisthesis* akin to that by which we perceive [*aisthanometha*] that the particular figure before us is a triangle. (EN, 1142a25-9)³³

Recall Passage C. Passage C, from *APo.* B.19, is about the knowledge (*gnôsis*) of the principles (*archai*) of demonstrations and demonstrations yield *epistêmê* (not *phronêsis*, i.e., “practical wisdom”). *APo.* B.19 at 100b5-17 calls this state of knowledge of the principles “*nous*” (“comprehension” in Barnes’ translation). Thus, if the perception mentioned in statement Cd is intellectual perception as Harari claims, it seems that the perception would have to be performed by the intellectual faculty which is *nous*. But the claim of Passage N with the sentence fragment just before it is that *phronêsis* is like perception (*aisthêsis*), not that *nous* is. Indeed, this passage *opposing nous* and *phronêsis* implies that *nous* is *not* like *phronêsis*, which implies that *nous*, unlike *phronêsis*, may *not* be like perception.

Passage N provides evidence that Aristotle thinks we have intellectual perception, or something *like perceptual recognition*, that is *phronêsis* (“practical wisdom” or “prudence”). But the *Posterior Analytics* is work on, not *phronêsis*,

³³ The translation at EN, 1142a25-6 up to “while” (“*de*”) is by Ross in Aristotle, *The Complete Works of Aristotle Vol. II* (ibid.); the translation at 1142a6-9 from “practical wisdom” (referenced by “*hê*” in the Greek text) is by Harari in Harari, 32. As with “*logos*” in Passage H above, I have already provided evidence that “*logos*” in this passage is better translated as “account.”

but *epistêmê* and *nous*, and, again, *APo.* B.19 is evidently about how we acquire the state which is *nous* and which grounds *epistêmê*. And it is clear that Aristotle thinks that *phronêsis* is not *epistêmê* or the state of knowledge that grounds demonstrations yielding *epistêmê*, namely *nous*.³⁴

We are now set to criticize the third stage of Harari's argument. The grounds, again, that Harari tries to establish for taking Passage C to say that sense perception of a single particular is always enough to "inductively perceive" the universal are as follows. (1) Aristotle thinks there is a sense of *epagôgê* (induction) which means something like perceptual recognition, except that it consists of grasping a universal for the first time. (2) Aristotle thinks we have a kind of perception which is not sense perception, but intellectual, *nous*-performed perception. These two grounds, it appears, have been undercut. Further, as I had argued earlier, the genetic account itself suggests that this view is wrong: it mentions that the *katholou* comes after sense perception, memory, and experience (*empeiria*) which is formed from *many* percepts.

I will make a further criticism of Harari's reading of Passage C. Given that the genetic account begins by discussing a faculty, perception (*aisthêsis*) that it says *all* animals share (*APo.*, 99b34-5), and that Aristotle does not think all

³⁴ Passage N with the sentence fragment just before it contains evidence that Aristotle does not think that *phronêsis* is *epistêmê* or *nous*. And, shortly before that passage, Aristotle says: "That practical wisdom [*phronêsis*] is not knowledge [*epistêmê*] is evident..." (*EN*, 1142a23).

animals have intellect (*noêsis*),³⁵ the genetic account evidently begins by discussing sense perception, not intellectual perception. Moreover, the two instances of inflections of “perception” (*aisthêsis*) in Passage C differ only in that the first is a passive verb with its grammatical subject (“*to kath’ hekaston*,” i.e. “the particular”) in the nominative case, and the second is a noun with its modifying adjective (“*tou katholou*,” i.e., “of the universal”) in the genitive case. This is hardly enough to indicate a radical change in the *kind* of perception from the first instance to the second. If, after the beginning of the genetic account in Passage C, Aristotle suddenly introduces a *kind* of perception (intellectual perception) different from the kind (sense perception) discussed at the beginning, we should expect him to note the difference. Further, Aristotle is typically sensitive when words are used in more than one sense. Given his style elsewhere,³⁶ if Aristotle in Passage C has two kinds of perception in mind, we should expect him in that passage to say something like, “Perception, said in one way, is of the particular, but said in another way, is of the universal,” or to otherwise note that he has introduced another kind of perception. But he does not do this.

³⁵ See, for example, *On the Soul* III.10: “...many men follow their imaginations as against their knowledge [*epistêmên*], and in the other animals, while there is neither thought [*noêsis*] nor rationality [*logismos*], there is imagination” (*DA*, 433a10-3). Indeed, the genetic account of *APo.* B.19 itself suggests that not all animals have cognitive faculties beyond sense perception (*APo.*, 99b34-a3).

³⁶ See, for example, *DA*, 410a14ff, where Aristotle discusses different senses of “that which exists” (“*to on*”), *DA*, 412a6ff, where he discusses different senses of “substance” (*ousia*), and *Met.*, 1054a33ff where he discusses different senses of “the same” (“*henos*”).

In conclusion, Harari's reading of the genetic account conflicts with mine in four respects. First, she thinks that the genetic account is about the acquisition of concepts and not propositions, whereas I think it is about the acquisition of concepts and correlatively of certain propositional truths. Second, Harari thinks that for Aristotle, the acquisition of these principles (which she thinks are just concepts and not propositions) is not the result of reasoning or argument, whereas I think that according to the genetic account the acquisition of principles involves (epagogic) reasoning. Third, Harari thinks that the genetic account is not concerned with a methodology of acquiring principles or with the justification of principles. She thinks the question, asked near the beginning of *APo.* B.19, of how we come to know the principles is intended to be equivalent to the question of whether the principles are innate or not. I, however, do think the genetic account is concerned with the justification of the principles, and think the question of whether the principles are innate or not is intended to be subsidiary, rather than equivalent, to the question of how we come to know them. Finally, in Harari's reading of Passage C, Aristotle mentions two kinds of perception: sense perception, which is of the particular, and an intellectual, "inductive perception," which is of the universal. I, however, think that statement Cc that "the particular is perceived" *and* statement Cd that "the perception is of the universal" are both referring to sense perception.³⁷

³⁷ My position, which I have argued for in Ch. 2 on Hamlyn, is that for Aristotle only the

It appears that for all four points of conflict, I have disqualified, or at least significantly undermined, the evidence for her positions. I have presented the evidence for my sides of the four points of conflict partly in Ch. 2 on Hamlyn and partly in this chapter.

IV. Conclusion

In Aristotle's works, there appears to be the following contradictory triad:

- (a) *Epagôgê* is the means of coming to know principles (as indicated by *APo.* B.19).
- (b) *Epagôgê* is a kind of *logos* (as indicated by various texts).
- (c) *Nous*, not *logos*, is the means of coming to know principles (as indicated by the passage from *EN*, 1143a35-b4).

In regard to this contradictory triad, Evans seems to deny that Aristotle holds (a) whereas Harari denies that Aristotle holds (b). However, I have defended (mostly in Ch.2 on Hamlyn) my claim that Aristotle holds (a), and have provided much evidence that he holds (b). We should, however, deny that he held (c) if "*logos*" in (c) is given the same meaning as in (b), i.e. "reasoning." It is more reasonable to hold, instead, that in the evidence taken to support that Aristotle held (c), "*logos*" has a different sense than in other places in his works, the sense of "explanatory account."

particular is the *object* of sense perception. Again, what exactly Cd claims with regard to sense perception I will discuss in the next chapter.

In Evans' interpretation of the genetic account, *nous* is rational intuition which, according to Passage C, allows one to grasp a universal truth as a truth from the sense perception of just one particular, thereby solving the problem of induction. In Harari's interpretation, *nous* is intellectual perception which, according to Passage C, allows one to "inductively perceive" a universal concept from the sense perception of just one particular instance. But on the basis of my resolution of the contradictory triad, and my disqualification of other evidence, the evidence that *nous* in the genetic account should be conceived of as direct intuition or perception that allows one to grasp the universal in the sense perception of particulars has been undercut. What I have defended so far with regard to Passage C is, in Ch. 2 on Hamlyn and in this chapter, is: (1) According to statement Cc that "the particular is perceived," the particular is the *object* of sense perception. (2) In statement Cd that "the perception is of the universal," sense perception is mentioned, but the statement does not claim that the universal is the *object* of sense perception. (3) Given that an earlier part of the genetic account that indicates that *many* percepts retained in memory form a single experience, and that from this a universal is obtained, we are not on good ground to take Passage C as claiming that the sense perception of *just one particular* is sufficient for grasping a universal (concept or truth).

I will offer a more complete reading of the genetic account of *APo.* B.19, and in particular, of Passage C, in the next chapter.

Chapter 4: My Reading of the Genetic Account

I. Introduction

Up to this point, I have defined a certain sense of “induction” and have provided evidence that Aristotle considers some *epagôgê* to be induction in that sense (Ch.1). Further, I have argued against certain complex readings of the genetic account of *APo.* B.19 that conflict with my own. I have done this to “clear the way” to present my own reading of the genetic account (Ch. 2 and 3).

With regard to my own reading of the genetic account, so far, in Ch. 2 and 3, I have offered only a *part* of my reading. In both chapters, I have defended the view that the genetic account is not just about the acquisition of concepts, but also of certain propositional definitional truths connected with the concepts acquired. Moreover, in both chapters, I have considered a crucial passage that is near the end of the account, Passage C:

[C]

[a] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular is perceived, [d] the perception is of the universal,--[e] e.g. of man, not of Callias the man. (*APo.*, 100a15-b1, trans. Barnes modified¹)

¹ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” This is done to make the translation more closely reflect the Greek.

In both Ch. 2 and 3, I have argued that this passage should not be read as claiming that the sense perception of a single particular, such as Callias, is sufficient to grasp its universal kind, such as man. Finally, in Ch. 2 on Hamlyn, I considered a passage at the end of the genetic account, Passage A:

[A]

It is clear then that we must recognize the first (principles) by induction (*epagoge*); for sense perception introduces the universal in this way. (*APo.*, 100b3-5, trans. Hamlyn in Hamlyn, 171)

In that chapter, I argued against Hamlyn that “in this way” (“*houtô*”) at 100b5 should be taken as referring to “*epagôgêi*” at 100b4. The resulting reading is that the genetic account prior to 100b4 is a description of the *epagôgê* mentioned at 100b4.

My intention in Chapter 4 is to provide my complete reading of the genetic account in *APo.* B.19. I will offer some initial evidence for my reading. However, the main defense of my reading will be provided in the next chapter.

Before offering my reading of the genetic account, I will offer an argument (in Section II below) that Aristotle upholds the existence of both particular and universal forms. This argument will be mainly based on material from the *Metaphysics* and *On the Soul*. The argument does not seek to resolve the controversy among scholars about whether Aristotle, at the end of the “middle books” of the *Metaphysics*, decides that particular forms or universal forms (or other beings) are *primary substances* or in some other way ontologically primary.

It merely seeks to establish that Aristotle thinks that both particular forms and universal forms *exist* and that particular forms instantiate universal forms. This argument will provide a basis for my support for my reading of the genetic account as well as my subsequent criticisms of other readings of the genetic account.

Then, in Section III, I will offer my positive reading of the genetic account and provide some support for it, and in Section IV I will offer my conclusion.

II. Particular and Universal Forms

There is an exegetical puzzle in the “middle books” (Z, H, and θ) of *Metaphysics*, familiar to commentators, that has led to disputes about whether Aristotle considers forms to be particular or universal. This puzzle can be presented in the form of three apparently incompatible theses, each of which Aristotle seems to uphold in the *Metaphysics*. In *Met.* Z.3 and Z.13, he suggests that substances are particular.² Further, statements in Z.7 suggest that forms are

² One suggestion that substances are particular is in *Met.* Z.3 at 1029a27-8. Here, Aristotle says, in response to the consideration that substance is matter, that “...this is impossible; for both separability [*to choriston*] and individuality [*to tode ti*] are thought to belong to substance.” A more explicit, seemingly unequivocal statement that substances are particular can be found in Z.13: “...it seems impossible that any universal term should be the name of a substance. For primary substance is that kind of substance which is peculiar to an individual, which does not belong to anything else; but the universal is common, since that is called universal which naturally belongs to more than one thing” (*Met.*, 1038b8-12).

substances.³ Finally, statements in Z.4, 7 and 11 suggest that forms are universal.⁴ Different commentators on the middle books of the *Metaphysics* have offered and defended different solutions to this puzzle. I will discuss some of these commentators at the end of this section. However, my primary purpose here is not to solve this puzzle. It is only to defend the thesis that ultimately Aristotle recognizes both particular and universal forms, even if he regards one as primary substance (or in some other way as ontologically primary) and the other as ontologically secondary and unimportant.

One can find textual evidence that Aristotle recognizes particular forms, and also that he recognizes universal forms. (For some of the latter evidence, please see the last footnote.) The main textual evidence that he recognizes particular forms can be found in three passages in *On the Soul* considered together. First consider the following passage:

³ An example of one such statement in Z.7 is: “[b]y form, I mean the essence of each thing and its primary substance.” (*Met.* Z.7, 1032b1-2)

⁴ Consider this statement in Z.11: “...definition is of the universal and of the form.” (*Met.*, 1036a28). Consider also this one in Z.15: “...there is neither demonstration nor definition of sensible individual substances...” (*Met.*, 1039b27-8) These two statements suggest that definition is of the universal and never of the particular. Consider also this statement in Z.4: “...there is essence only of those things whose formula is a definition” (*Met.*, 1030a6). This in connection with a statement in *Topics* (“...let us call the sort [of unique property] that signifies what it is to be [which can be paraphrased as “the essence of”] something a *definition*...” (*Top.* I, 101b23, italics in original)) suggests that definitions signify essences. So far, we have the suggestions that definition is only of the universal, and that definitions signify essences. Combine these with a statement in Z.7 that suggests that forms are essences: “[b]y form, I mean the essence of each thing and its primary substance” (*Met.*, 1032b1-2). The resulting suggestion is that forms are universal.

One kind...of the things that there are we call *substance*, and part of this group we say to be so as matter, that which is not in itself a particular thing, a second part we say to be so as shape [*morphên*] and form [*eidos*], in accordance with which, when it applies, a thing is called a particular, and a third as that which comes from the two together. (DA, 412a6-9, italics in original)

In connection with this passage, consider the following passage:

It must...be the case that soul is substance as the *form* of a natural body which potentially has life. (DA, 412a20-1, italics in original)

Further, in connection with the two passages above, consider the following passage:

It is quite clear...that the soul is not separable from the body, or that some parts of it are not, if it is its nature to have parts. (DA, 413a4-5)⁵

The remark that at least parts of the soul are inseparable from the body strongly suggests that each living thing has its own soul, and that all living things, or all living members of a given species, do not share a single soul. For if more than one living body shared a universal soul, it seems that then Aristotle, to be consistent, would have to say that the soul as such *is* separable from *particular* bodies.

There is also a passage in the *Metaphysics*, other than that referred to above (see fn. 2) that strongly suggests that Aristotle recognized particular forms. Indeed, this passage suggests what I want to maintain: that Aristotle recognized

⁵ A short, later chapter in *On the Soul* (Ch. III.5) apparently claims that the part of the human soul which is the active part of the intellect is the only part of the soul that survives the death of the body. On this reading of that chapter, in connection with the passage above, Aristotle thinks that all parts of the soul, except the active intellect, are inseparable from the body.

both particular forms and universal forms, and that particular forms instantiate universal forms:

...those [causes] of things in the same species are different, not in species, but in the sense that the causes of different individuals are different, your matter and form and moving cause being different from mine, while in their universal formula they are the same. (*Met.*, 1071a27-9)

It is implausible to read the clause, “your matter and *form* and moving cause being different from mine” (emphasis added) in a way other than one making reference to “your” form, and to a different form, “my” form, i.e. to *particular* forms. But the clause “while in their universal formula they are the same” also suggests that the different individuals in the same species share the same universal, i.e. species form.⁶

The clearest evidence that Aristotle recognized universal forms, in addition to the passage above, seems to be the passages in the *Metaphysics* referred to above (see fn. 4).

Some commentators think that this apparent discrepancy is best explained by the developmentalist hypothesis that Aristotle, upon considering certain problems with his view that forms are particular, eventually changes his mind in

⁶ “Universal formula” (*katholou logoi*) suggests definition of the species. Bear in mind that Aristotle seems to take definition to signify essence and form to be essence (see fn. 4).

the *Metaphysics*.⁷ Others adopt the more unitarian view that in the middle books of the *Metaphysics*, Aristotle still considers forms to be particular.⁸

My purpose here is not to attempt to resolve the apparent discrepancy myself, nor to defend the position of any of the commentators on this issue. It is rather to argue for a simpler and much more general thesis. This is the thesis that in some sense of “form,” Aristotle upheld the existence of particular forms, and that in some sense, he upheld the existence of universal forms. My position is that, though he may have regarded particular forms *or* universal forms to be ontologically secondary or unimportant, he upheld the existence of both.

Some of the textual evidence that Aristotle recognized particular forms is cited above. Additional evidence can be found in *DA* II.12, where Aristotle describes sense perception as the grasp or reception of a sensible form:

...we must grasp in general in connection with perception as a whole, that the sense is the recipient of the perceived forms without their matter, as the wax takes the sign from the ring without the iron or gold... (*DA*, 424a17-20)

⁷ See, for example, Michael Loux, *Primary Ousia* (Ithaca: Cornell University Press, 1991). For a related view, see G.E.L. Owen, “Particular and General” in G.E.L. Owen, *Logic, Science, and Dialectic* (Ithaca: Cornell University Press, 1986), 279-94. Owen seems to think that Aristotle’s final view is that primary substance is the universal form insofar as it is embodied in, or, in the case of generation, *about to be* embodied in, a certain parcel of matter.

⁸ For example, see Terrence Irwin, *Aristotle’s First Principles* (New York: Oxford University Press, 2002), 261-3. Any further reference to a work by Irwin, unless otherwise noted, will be to this book. See also Klaus Brinkmann, “The Consistency on Aristotle’s Thought on Substance” in William Wians, ed., *Aristotle’s Philosophical Development* (Lanham: Rowman and Littlefield Publishers, 1996), 289-302. Any further reference to a work by Brinkmann, unless otherwise noted, will be to this article.

As I have established in Ch. 2 and as Passage D in particular (presented in Ch. 2) from *On the Soul* indicates, the objects of sense perception are particulars.⁹ Clearly, the sensible forms are particular forms. Given that Aristotle also thinks that universal forms exist, and that it is in virtue of its form that a thing is what it is,¹⁰ particular, sensible forms instantiate universal forms, which should be viewed as what all the particular forms of a given kind have in common.

Commentators like Michael Loux, who hold that Aristotle's revised and final position is that forms are universal, might object in a certain way. They might claim that he would have considered the particular forms I mention above to be derivatives of universal forms. In this view, only the commonalities of the particular forms of all oak trees or axes, for example, would constitute their respective universal form, while the differences would be *consequences* of the universal form being embodied in matter. This view, however, is consistent with my position: it acknowledges that Aristotle, in *some* sense, recognized particular forms.

The main textual evidence from the *Metaphysics* that Aristotle recognized universal forms is cited above (see fn. 4). Even if one thinks that the middle books

⁹ Recall, in particular, statements Dc, "...perception in activity is of particular things..." (DA, 417b22) and Dg, "the sense-objects are among the particular and external things" (DA, 417b27-8).

¹⁰ See, for example, *Phys.* II.2: "Another account [of nature, different from matter] is the shape [*hê morphê*] or form [*to eidos*], which is specified in the definition [*ton logon*] of the thing" (*Phys.*, 193a30-1). See also fn. 4.

of the *Metaphysics* ought to be read as claiming that forms are particular (and that these are primary substances), one still needs to allow that in *some* sense Aristotle recognized universal forms. For this is the only way, as we have seen, that essences and definitions are possible for Aristotle. Thus, if one is convinced that Aristotle's final position is that primary substances are particular forms, one must allow that universals are forms in some sense, which appears to be what the forms of the particulars in a universal kind have in common.

Indeed, commentators on the middle books of the *Metaphysics* who think that Aristotle ultimately decides on particular forms as primary substances seem to acknowledge that, nonetheless, he also believes in universal forms. For example, Terrence Irwin in *Aristotle's First Principles* thinks that Aristotle, in the middle books of the *Metaphysics* ends up regarding universal forms as secondary substances of one sort (Irwin, 261-70).¹¹ A crucial part of Irwin's reason is the one I give above: that Aristotle (at one point in the middle books) considers definitions to be "of the universal" and "of the form" (Irwin, 261-3).

Also, Klaus Brinkmann, who in "The Consistency of Aristotle's Thought on Substance" also considers Aristotle to decide on particular forms as primary substances in the *Metaphysics*, allows that Aristotle must also uphold universal

¹¹ Irwin claims that Aristotle in the middle books of the *Metaphysics* does not *call* universal forms "secondary substances" apparently because Aristotle thinks there are secondary substances (such as matter-form composites) other than universal forms. See Irwin, 267.

forms. For it is universal forms that are intelligible (i.e. conceptually graspable).
(Brinkmann, 293-99)¹²

In short, if one takes Aristotle to ultimately decide on particular forms as primary substance, his allowance of universal forms in addition nonetheless seems inescapable.

In regard to the issue of whether Aristotle considered forms to be particular or universal, I maintain that the only plausible position is that he upheld both particular and universal forms, regardless of which (if any) he ultimately decides on as primary substance.¹³

III. My Positive Reading of the Genetic Account

Before I offer my positive reading of the genetic account, I will review two preliminary claims about *APo.* B.19 that I made in Ch. 2 in my response to Hamlyn. The first is that the chapter begins with two questions: how *archai* are acquired, and what is the state that grasps them. The answers to these two questions, respectively, are: *epagôgê* based on sense perception, and *nous*.

¹² See also the view expressed by Jonathan Barnes in “Metaphysics” in *The Cambridge Companion to Aristotle* (Cambridge: Cambridge University Press, 1999), 66-108. Barnes’ position on Aristotelian forms is similar to mine: “...in a sense Socrates and Callias have the same form, and in a sense, each has his own form” (ibid., 98).

¹³ Hence, with regard to a natural kind, such as man or horse, each member would have a different particular form but share the same universal form.

The main pieces of evidence for this claim are as follows. Near the beginning of Ch. B.19, Aristotle asks about the principles (“*peri tôn archôn*”) how they become known (“*ginontai gnorimoi*”) and what is the state (“*hexis*”) which comes to know (“*gnôrizousa*”) them (*APo.*, 99b17-9). Next, consider again Passage A from Ch. B.19 (discussed in Ch. 2):

[A2]

Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which [*houtô*] perception instills the universal. (*APo.*, 100a14-b5, trans. Barnes modified¹⁴)

In Ch. 2, I argued against Hamlyn that we should take “*houtô*” in this passage (translated here as “this is the way in which”) to refer to “*epagôgêi*,” which would imply that the genetic account preceding this passage describes a process of *epagôgê*. And the genetic account beginning at *APo.*, 99b35 describes a process that begins with a faculty (*dunamis*) possessed by animals (presumably, human or otherwise): perception (*aisthêsis*). Thus, by the end of Passage A2, Aristotle appears to have answered his first question. How do we come to know the *archai*? Aristotle’s answer appears to be: by *epagôgê* based on sense perception.

¹⁴ My modification is to replace Barnes’ “universals” with “the universal” to make the translation more closely reflect the Greek. In Ch. 2 on Hamlyn, I used Hamlyn’s translation of this passage since that chapter was a response to Hamlyn. Here, since my purpose is mainly to present my reading of the genetic account rather than to respond to other commentators, I am using Barnes’ standard translation, slightly modified so that it more closely reflects the Greek text. Since it is the second translation of this passage I have presented, I have designated that fact by adding “2” to its label “A.” Again, Passage A is a part (i.e., at the end) of Passage B (presented in Ch. 2).

But, after Passage A2, at *APo.*, 100b5-17, Aristotle says that the state (*hexis*) of knowing the *archai* is not *epistêmê* but *nous*. Here, Aristotle appears to answer his second question. What is the state that comes to know the *archai*? Aristotle's answer, evidently, is: *nous*.¹⁵ This is my reason for taking Aristotle's answer to the second question to be *nous*.

This claim has the implication that “*nous*,” as used in the context of Ch. B.19, explicitly denotes a state (*hexis*), not a faculty (*dunamis*). As will become evident in my next chapter, this implication is part of my support for my claim that Aristotle does not think that the solution to (or the way to avoid) the problem of induction is simply *nous* as intuition.¹⁶

The second preliminary claim is that the genetic account is not just about acquiring concepts, nor just about acquiring true propositions of certain sort, but acquiring both. My claim, more specifically, is that the account is about acquiring concepts, which correlatively involves acquiring true propositions of a certain sort (namely, those which fall into the class of things Aristotle calls “*archai*” in the *Posterior Analytics*). This claim helps us resolve the tension in reading the genetic account created by evidence that it is about *concept*-acquisition, and other evidence that it is about the acquisition of true *propositions* of a certain sort.

¹⁵ Both Barnes (in Barnes (2002), 260-9) and McKirahan (in McKirahan (1992), 244-50, 257-8) take *epagôgê* and *nous* as Aristotle's answers to his first and second questions respectively.

¹⁶ See, in particular, Barnes (2002), 268, where Barnes recognizes this implication and also sees it as counter-evidence to the view that *nous* is intuition.

Recall the three considerations I present in Ch. 2, Section IV to support this claim. The first begins with the point I make just above. The beginning of *APo.* B.19, again, asks how we come to know the principles and what the knowing state is. Since *states* of knowledge are explicitly discussed at 100b5-17, it appears that the genetic account at 99b35-100b5 is intended to answer the first question. Further, there is a strong suggestion early in the *Posterior Analytics* that the “principles” (“*archai*”), “primitives” (“*prôta*”), and “immediates” (“*amesa*”) are intended to be synonymous, all referring to the ultimate premises of demonstration.¹⁷ Indeed, *APo.* B.19 says: “I have said earlier that you cannot understand anything through a demonstration unless you know the *primitive immediate principles*” (*APo.*, 99b20-3, emphasis added). Second, *APo.* A.4 seems to require that the predication in an ultimate premise of demonstration be an essential (i.e., definitional) one.¹⁸ Third, as I argue in Ch. 3, the statement at *APo.*, 100a6-9 that from the grasp of a universal “...there comes a principle of skill or understanding...” should be taken as claiming that from a grasped universal concept, one gets a propositional principle connected with that concept. In connection with these considerations, though the “primitives” that Passage A2 seems to refer back to are concepts like “man” at 100b1 and “animal” at 100b3, the “primitives” can be interpreted as also

¹⁷ See Ch. 2, fn. 36.

¹⁸ See Ch. 2, fn. 37.

referring to certain related, definitional propositions (such as “all (or most) humans reason” and “all (or most) animals have sense perception”).¹⁹

I will now turn to my more detailed, positive reading of the genetic account. I will begin with statements Aristotle makes just before he offers his genetic account.

Early in Ch. B. 19, Aristotle writes:

[O]

I have said earlier that you cannot understand [*endechetai epistasthai*] anything through a demonstration unless you know [*gignôskonti*] the primitive immediate principles. (*APo.*, 99b20-3)

There seem to be several of these “earlier” passages in the opening chapters of the *Posterior Analytics*. One is in Ch. A.1 at 71a1-16, where Aristotle says that all teaching and learning depend on having prior knowledge. This implies that demonstration depends on some kind of prior knowledge. Another is in Ch. A.2 at 72a6-24, where Aristotle says that demonstrations must proceed from principles

¹⁹ Given that the state of knowledge of the principles is *nous*, the statement in *EN* VI at 1142a26 that “comprehension [*nous*] is of the definitions [*tôn horôn*]” and at 1143a36-7 that “both the primary definitions [*tôn prôtôn horôn*] and the ultimates [*tôn eschatôn*] are objects of comprehension [*nous*]” appear to support my claim that the genetic account (in addition to being about the acquisition of concepts) is about the acquisition of certain definitional propositions connected with the concepts that are acquired. “The ultimates” mentioned by the latter statement appear to be ultimate premises of demonstration. This is more reasonable than their being extreme terms, since it seems that the genetic account, given that it is in part about the acquisition of concepts, is not only about the acquisition of the *extreme* terms of demonstration, but also *middle* terms.

(*archai*).²⁰ Later in that chapter, at 72a37-5, Aristotle says that anyone who is to possess demonstrative understanding (*epistêmê*) must know better and be more convinced of the principles of demonstration than what is understood. Finally, another is in Ch. A.3 at 72b5-25, where Aristotle posits that a demonstration or a chain of demonstrations comes to an end; it does not regress infinitely or form a circle. Immediates, Aristotle says, are indemonstrable (*APo.*, 72b19-23). Later in that chapter, at 72b25-73a20, Aristotle provides his argument for that posit.

Returning to Ch. B.19, following that quoted statement, Aristotle writes:

As for knowledge [*gnôsin*] of the immediates, one might wonder whether it is the same or not the same, and whether there is or is not understanding in each case or rather understanding in the one case and some other kind of knowledge in the other... (*APo.*, 99b22-5)

Given that Passage O is just prior to this one, it seems that the reasonable way to take the first alternative expressed is: “whether knowledge of the immediates also depends on immediates or does not.” The second alternative expressed, apparently, is: whether knowledge of immediates is also understanding (*epistêmê*) or some other kind of knowledge.

Aristotle finishes that statement with another alternative. He writes:

[P]

...and also whether the states, not being present in us, come about in us or are present in us without being noticed. (*APo.*, 99b24-7)

²⁰ And, as mentioned in Ch. 2 of this work, at 72a6-15, he appears to equate principles, primitives (*prôta*), and immediates (*amesa*) with one another.

The alternative that Aristotle has in mind seems to be: either we *acquire* this knowledge (i.e., the *gnôsis* mentioned above at 99b22) or it is *innate* without our noticing that we have it.

Aristotle then offers a brief argument that the latter alternative, i.e. that this knowledge is innate without our noticing it, is incorrect:

[Q]

It is absurd to suppose that we possess such states; for then we should possess pieces of knowledge more exact than demonstration without its being noticed. (*APo.*, 99b26-7)

By “we possess these states,” Aristotle apparently means “we possess these states at birth”; he is apparently objecting to the second of the two alternatives expressed in the passage quoted just before this one.

Following this, Aristotle considers the first of the two alternatives, but appears to reject it as well:

[R]

But if we get them without possessing them earlier, how could we come to acquire knowledge and to learn except from pre-existing knowledge? This is impossible, as I said in connection with demonstration. (*APo.*, 99b28-30)

The last sentence seems to be referring back to Passage O, presented above. Next, Aristotle argues:

[S]

It is clear, then, both that we cannot possess these states and also that they cannot come about in us when we are ignorant and possess no state at all. We must therefore possess some sort of capacity [*dunamin*]—but not one which will be more valuable than these states in respect of exactness. (*APo.*, 99b30-4)

The second sentence in this passage appears to present the conclusion of the argument begun in Passage P. While, as I have mentioned above, Aristotle in Passage P seems to consider only two alternatives, it seems that he really begins with a premise with *three* disjoined alternatives. At least, that is what seems to be needed to make his argument, ending with his conclusion in Passage S, valid. The premise consisting of the three disjoined alternatives seems to be the following. Either (1) we possess the states of actual knowledge of the principles at birth, or (2) we acquire such states of actual knowledge from no prior knowledge, or (3) we possess at birth a state which is a capacity (*dunamis*, potentiality, faculty) to acquire the states of actual knowledge. The argument in Passage Q argues against alternative (1). Passage R seems to rule out alternative (2). Hence, Passage S seems to draw the conclusion that (3) we possess at birth a state which is a capacity to acquire the states of actual knowledge.²¹

²¹ The qualification that Aristotle makes in Passage S appears to be that the state which is a capacity (*dunamis*) that we possess at birth *cannot be more exact than the actual states of knowledge that are obtained from it*. This qualification seems to be concerned with Passage Q. For although Passage Q says that it is absurd that we possess states of knowledge (at birth) more exact than *demonstration* without our noticing it, that passage can be read as tacitly upholding the wider claim that it is absurd that we possess any state of knowledge at birth (even one which is a mere capacity or potentiality (*dunamis*)) that is more exact than the states of knowledge (even non-

Aristotle then begins his genetic account by discussing sense perception (*aisthêsis*), which he says we share with all animals:

And this is clearly true of all animals: they have a connate discriminatory capacity [*dunamin sumphuton kritikên*], which is called perception. (*APo.*, 99b34-5)

Clearly, it is perception that is the capacity (*dunamis*) state that Aristotle thinks is innate, the state *from which* the actual state of knowledge of the *archai* is *acquired*. More exactly, as we will see later, the state of knowledge of the *archai* is acquired from the innate capacity of perception *in connection with* certain other capacities (such as memory and the capacity to form “experiences” (*empeiria*).)

Aristotle continues:

[T]

Given that perception is present in them, in some animals the percepts are retained and in others they are not. If they are not, then the animal has no knowledge [*gnôsis*] when it is not perceiving (either in general or with regard to items which are not retained). But some can still hold percepts in their soul after perceiving them. When this occurs often, there is then a further difference: some animals come to have an account [*logon*] based on the retention of these items, others do not. (*APo.*, 99b36-100a3)

Three remarks need to be made about this passage. First, the Greek word (or phrase) that is translated as “percept” is an inflection of the noun “*to aisthêma*” (literally, perception (Liddell-Scott, 23)) or a passive participle form of the verb “*aisthanomai*” (perceived by the senses (Liddell-Scott, 23)) used as a noun. What

demonstrated knowledge) that are obtained from it. Reading Passage Q in this way allows us to interpret the qualification Aristotle makes in Passage S as for the sake of internal consistency.

this indicates is that a “percept” is an object of perception (and as something retained in memory in the case of some animals, as the passage also indicates). As I have indicated earlier (in Ch.2) that for Aristotle particulars are objects of sense perception and (in Section II above) that Aristotle considers sense perception to be the reception of the perceived form of thing apart from the matter, it is reasonable to take the particulars retained in memory, i.e. the retained percepts, to be particular forms. Second, as I have already suggested in Ch. 3 and above in this section, that the “account” should be taken as a propositional principle of demonstration. Third, the process described by this passage is evidently described in more detail or “fleshed out” by the following passage, as the following passage suggests. So we should now consider the following passage:

[U]

[a] Thus from perception there comes memory [*mnêmê*], as we call it, and from memory (when it occurs often in connection with the same item) experience [*empeiria*]; for [b] memories which are many in number form a single experience. [c] And from experience, or from all the universal [*tou katholou*] which has come to rest in the soul (the one apart from the many, i.e. whatever is one and the same in all these items), there comes a principle [*archê*] of skill [*technês*] or understanding—[d] of skill if it deals with how things come about, of understanding if it deals with how things are. (*APo.*, 100a3-9)²²

As the content of this passage suggests, it adds detail to the description of Passage T. (Hence, the “Thus” (“*oun*”) at the beginning of the passage should be taken in an explanatory, rather than inferential, sense.) Accordingly, “memory” that comes

²² Passage U includes Passage E, discussed in Ch. 2.

from “perception” should be taken as a “retained percept,” in the terms of the prior passage. Statement Ua, next, says that from memory, when it occurs in connection with the same item, comes experience. There is a question of whether “item” here means a particular thing (such as Callias) or a *kind* of thing (such as man). For now I will simply proffer my reading of this statement: “item” refers to a *kind* of thing (such as man), though this should not be taken to imply that the person performing the cognitive process has, at this stage, *grasped* the kind. (The person is in the *process* of grasping the kind.²³) Given this, I think it is clear that the “experience” (“*empeiria*”) referred to by this statement (and indeed, elsewhere in the genetic account) is supposed to be particular percepts of the same kind (e.g., man) retained in memory and associated in memory with one another. In addition, they are associated with one another on the basis of the particular objects of perception having similar particular forms. For, as will be made clearer in this chapter and in Ch. 7, this will explain how Aristotle could try to justify, plausibly, how one could grasp the universal (i.e. the species form), on the basis of perceptions of particular tokens of the universal.

Statement Uc should be taken as claiming two things. First, from an experience arises a universal—i.e. what one grasps is common to all the

²³ I uphold this reading in part because it would help explain how Aristotle could try to justify grasping a universal kind from sense perceptions of particulars. Further, I will defend this reading against the alternative in the next chapter where I discuss Greg Bayer’s reading of the genetic account.

particulars grasped in the experience, such as the form man—in the soul. The universal, according to statement Uc is “the one apart from the many, i.e. whatever is one and the same in all these items...” It is reasonable to take “all these items” to here to refer to all the particular percepts comprising the experience. For statement Uc appears to describe a move from grasped particulars to the grasp of a universal, and the particulars grasped so far are percepts comprising an experience. As we will see, this “one apart from the many, this thing that is “one and the same in all these items,” should be taken to be the universal form. Second, from that universal comes a propositional principle of understanding or skill—such as “all humans are mammals” (if one has already advanced beyond this stage and has grasped the genus animal) or “all (or most) humans reason.” Recall that my second preliminary claim is that the genetic account is about the acquisition of concepts *and* true propositions of a certain sort. The sort is definitional truths that serve as principles of demonstration.²⁴ Accordingly, it seems that the two examples I gave are two that Aristotle would consider definitional truths.²⁵ Again, my main justification for this reading is that it helps produce a coherent reading of the entire genetic account, as will become

²⁴ Only definitional truths can satisfy the predication requirements for the premises of demonstration laid out in *APo.* A.4.

²⁵ This, of course, is on the reasonable assumption that Aristotle would take “rational animal” or “rational mammal” as a definition of man. For evidence that Aristotle considered rationality distinctive to humans, see, for example, *On the Soul* III.10: “...many men follow their imaginations as against their knowledge [*epistêmên*], and in the other animals, while there is neither thought [*noêsis*] nor rationality [*logismos*], there is imagination” (*DA*, 433a10-3).

clearer later. In particular, the second putative claim can be made to tie in to the passage quoted prior to this one. The “account” (“*logon*”) referred to by the last sentence of Passage T should be taken to be the propositional principle referred to by statement Uc-d.

Finally, this last passage says that if the principle is about how things come about, it is a principle of skill (or, alternatively, of “craft,” another translation of “*technê*”). So, presumably, a proposition like “all marble statues come about from marble being carved by certain hand tools” would be a principle of skill, rather than of understanding (*epistêmê*).

So far, my reading of the genetic account gives us a picture in which one begins with sense perception and proceeds to a propositional principle. One perceives many particulars of a kind (for example, humans), and retains the percepts in memory. The percepts are associated with one another as a result of having similar particular forms, thereby forming an experience (*empeiria*). From such an experience, one grasps the universal kind (for example, man). Evident in the particulars grasped, and as a result in the universal, is a propositional definitional principle or *archê* (such as “all (or most) humans reason”).

Let us now turn to the next passage:

[V]

[a] Thus the states in question neither inhere in us in a determinate form nor come about from other states which are more cognitive; rather, they come about from perception—[b] as in a battle when a rout has occurred, first one man makes a stand, then another does, and then another, until a position of strength is reached. [c] And the soul is such as to be capable of undergoing this. (*APo.*, 100a10-4)

Statement Va is evidently repeating what Aristotle has stated already. For apparently, the “states in question” that it mentions are states of the knowledge of the *archai*. The claim that these states do not inhere in us in a *determinate form* should be taken to mean that the states of *actual* knowledge of the *archai* are not innate. The next claim—that these states come from sense perception—should be taken to mean that that the *capacity* (*dunamis*, potentiality) which is sense perception, when *actualized* (in connection with the subsequent actualization of other potentialities, such as memory, forming experiences, etc.) yields the state of *actual* knowledge of the *archai*. Given that statement Va is a repetition of what has already been said, the “Thus” (“*dê*”) in the sentence should be taken as explanatory rather than as inferential.

As for statement Vb, there is one main issue: what exactly are the individual soldiers intended to represent? The passage itself suggests that they are intended to represent particular percepts. Two aspects of Passage V suggest this. First, this description of a rout as a metaphor is given right after the statement that “they [presumably, the states of knowledge of the *archai*] come about from

perception,” with the phrase “as in a rout” following. This suggests that each soldier represents a something that is grasped by sense perception (i.e. a percept). Second, each soldier is an individual (i.e., a particular), and, as argued in Ch. 2 on Hamlyn, and as suggested by the prior passages of the genetic account, Aristotle considers particulars to be the objects of perception.

However, my position is that each soldier is really intended to represent an experience (*empeiria*) or a collection of universals rather than an individual percept. To see evidence for this we need to consider the next passage, one which we have discussed in Ch. 2:

[B]

[a] Let us say again what we have just said but not said clearly. [b] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; for although the particular is perceived, the perception is of the universal,—e.g. of man, not of Callias the man. [c] Next, a stand is made among these items, until something partless and universal makes a stand. E.g. such-and-such an animal makes a stand, until animal does; and with animal a stand is made in the same way. [d] Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which perception instills the universal. (*APo.*, 100a14-b5, trans. Barnes modified²⁶)²⁷

Understanding exactly what Aristotle intends the “undifferentiated items”

(*adiaphora*) to be is crucial to understanding what the individual soldiers in

²⁶ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” In the last sentence, “universal” replaces Barnes’ “universals.” This is done to make the translation more closely reflect the Greek.

²⁷ Passage A2 above is a part of (the end of) Passage B.

Passage V are intended to represent. For Passage B is intended to be a clarification of the description of the rout metaphor in Passage V. For Aristotle begins Passage B with the sentence: “Let us say again what we have *just* said but not said clearly” (emphasis is added). And, according to Passage B, one of the undifferentiated items first “makes a stand” (“*stantos*”), just as in Passage V, one of the routed soldiers first “makes a stand.”

Given this, we should recognize that a serious problem results if we take the *adiaphora* of Passage B to be particulars perceived or particular percepts. For then, the first sentence in Passage B would seem to say that the sense perception of a single particular, a single percept, is enough to instill in the soul the universal subsuming the particular. However, recall the evidence I present in Ch. 2 and 3 that for Aristotle, sense perception of a single particular is (usually) not sufficient to grasp a universal. In particular, consider the part of the genetic account that describes the formation of experiences (*empeiriai*), each consisting of multiple memories “of the same item.”²⁸ Passage U, as we discussed, treats memories and the formation of an experience as a stage in the process of acquiring an *archê*.

My view is that each *adiaphoron* is intended to represent an experience (*empeiria*) or collection of universals, that is *undifferentiated* (hence, the word “*adiaphora*”) in one’s mind from other percepts and experiences in ones memory.

This view of the *adiaphora* of Passage B solves the problem that results when an

²⁸ Whether each “item” should be understood by the reader as a single particular or as a *kind* of particular, I will discuss shortly.

adiaphoron is taken as a single particular. For on my view, the stage of forming an experience is not omitted in Passage B. And though one may claim that on my view, Passage B omits the stage of sense perceptions of particular things, one need not consider that as contradicting the earlier part of the genetic account that evidently describes sense perceptions of particulars as the beginning of the process. For one can read Passage B as “picking up” with an experience having been formed, and then proceeding from there.

Further, assume that the first few *adiaphora* are each an experience that consists of multiple memories, each being the retained percept of the same *kind* of thing (so that, for example, an experience consists of a percept of Socrates, one of Callias, one of Alcibiades, etc.). We can now make more sense of statement Bb in a plausible way. On that assumption, we should consider an *adiaphoron*’s “making a stand” to be the act of becoming a *diaphoron*, i.e. becoming *differentiated* from other percepts and experiences in one’s memory.²⁹ For recall that an *adiaphoron* should be taken as analogous to a retreating soldier in the rout metaphor. From the perspective of a member of the opposing side, the retreating soldier would be a blur—*undifferentiated* from other retreating soldiers—until he “makes a stand.” When he “makes a stand,” he is no longer a blur; he is differentiated from the others.

²⁹ We could say that the *differentiation* of the experience suggests or implies a *differentia* (*diaphoron*) distinguishing it from others in its genus. *Explicitly* identifying the *differentia* will become possible once the genus of the experience is grasped, but is not possible or necessary before that point.

For an *adiaphoron* to “make a stand,” i.e., to become differentiated, is for the species form of the *kind* of particulars subsumed by the experience to be differentiated from the forms (particular or species) of other percepts and experiences in one’s memory. That is, the species form becomes salient in one’s mind. For an experience to make a stand—become differentiated—in one’s soul is for its species form to make a stand in one’s soul. A simple example of this process would be that of a child in the fourth-century B.C. Athens. Having perceived, and retained in memory percepts of, many animals, including horses, the percepts of horses are an undifferentiated experience (*empeiria*) in his or her mind. At a certain point, however, that experience becomes differentiated (e.g., from retained percepts of cows, sheep, goats, etc.), i.e. the experience “makes a stand” in his or her mind. Its becoming differentiated is the universal form of horse “making a stand,” i.e., becoming salient, in the child’s mind, as the universal form of horse is different from that of cows, goats, etc. At that point, “there is a primitive universal [namely, horse] in the soul” of the child.³⁰

For the next stage, a soldier would represent an undifferentiated collection of universals, such as man, horse, dog, etc. When these “make a stand,” i.e. when

³⁰ I hold that “primitive” in this context should simply be taken to mean *infima* species level. Also, I am aware that some commentators, such as Barnes, take *adiaphora* to be *infima* species (as such species have no *differentiae* within them). I will discuss these readings in the next chapter. For now, we can consider one advantage of my reading. The statement “[w]hen one of the undifferentiated items make a stand, there is a primitive universal in the soul” seems redundant on Barnes’ interpretation of “undifferentiated items” (“*adiaphora*”), but is not so on mine.

they become differentiated, the universal form that they share is distinguished from other forms in the soul, and thereby made salient. At that point, a higher universal, such as animal, is in the soul.

Hence, my interpretation of “*adiaphora*” as experiences each consisting of multiple retained percepts of particulars of the same kind plausibly solves problems that interpreting “*adiaphora*” as particulars creates.

But what about what was said in favor of taking an *adiaphoron* as a particular? Recall that the “rout” passage in Passage V comes right after a claim that the states (apparently of knowledge of *archai*) comes from sense perception, and each soldier on the routed side “making a stand” is an individual, i.e. a particular. And, as I argued in Ch. 2, for Aristotle, particulars are the objects of perception.

Given my reading of Passage B so far, these would be presumably unintended suggestions by Aristotle that each *adiaphoron* is a single particular, and such suggestions would constitute a lack of clarity on the part of Aristotle. But such lack of clarity is preferable to the alternative. For on the view that an *adiaphoron* is a single particular perceived, or single percept, we get the result of Passage B claiming that the sense perception of a single particular (or a single particular percept) is enough to instill in the soul a universal. And I have already argued in detail in Ch. 2 and 3 against this reading. Recall, in particular, that this reading entirely omits a stage that Aristotle described earlier in the genetic

account: the formation of an experience through multiple memories “of the same item.”

Further, given my interpretation, it seems that we can justifiably claim that Aristotle is, in some terms, aware of this lack of clarity. For observe again that Passage B comes right after Passage V and claims to be a clarification of Passage V. Yet, as the commentary on these passages indicates, Passage B hardly *clarifies* Passage V. If we assume my interpretation of the “*adiaphora*” in Passage B, we can take Aristotle’s claim of clarification at the start of Passage B as intended to remove the suggestion that the routed soldiers each represent a particular perceived or a particular percept. We can take the claim to indicate instead that each retreating soldier represents an experience consisting of multiple retained percepts that are as yet undifferentiated from other percepts in one’s memory.

Let us now consider more of Passage B, namely, Passage C, which we discussed in Ch. 2 and 3:

[C]

[a] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular is perceived, [d] the perception is of the universal,--[e] e.g. of man, not of Callias the man. (*APo.*, 100a15-b1, trans. Barnes modified)

I argued in Ch. 2 on Hamlyn that statement Cc of this passage—“the particular is perceived”—refers to the particular as the *object* of sense perception. But for statement Cd—“the perception is of the universal”—I left open what relation is

intended between the universal and sense perception, arguing only that “*tou katholou*” (“of the universal”) should not be taken as being in the genitive of *object* (so that this statement is not saying that the universal is the *object* of perception). I now claim that statement Cd should be taken as claiming that the universal is the *subject* of the sense perception in the sense that the particular perceived represents its universal. Recall the evidence I cited in Section II above from *On the Soul* that for Aristotle, sense perception consists of the reception of the *particular* form, apart from the matter, of the object. Further, recall my argument above that Aristotle upholds the existence of both particular and universal forms, where a universal form consists of what is common to the particular forms it subsumes. With this in mind, we can make sense of how for Aristotle, the perception of a particular object—Callias, for example—could represent a universal—man, for example. For the act of perceiving Callias would consist of perceiving at least the particular form of Callias.³¹ And, as my argument above on particular and universal forms indicates, the particular form of Callias is what makes him instantiate the universal man, i.e., what makes him a man. As such Callias, with his particular form (if not also his matter), represents (in the sense of instantiating) the universal man. That is, when one perceives

³¹ For Aristotle, the act of perceiving Callias might *also* consist of perceiving the matter of Callias, so that it consists of perceiving the matter-form substance which is Callias. This conception of Aristotelian perception is also compatible with my reading of Passage B, since according to this conception, the particular form *is* perceived.

Callias, Callias is the object of the perception, but man is the subject. We can, in this way, make sense of the entirety of Passage C.

This reading of statement Cc-d should not be taken to imply that the act of perceiving a single particular (e.g., Callias) is sufficient to grasp its universal kind (e.g., man). For, again, this appears to contradict the earlier part of the genetic account that the formation of an experience, consisting of many memories “of the same item,” is needed as a stage.³² Given this, my reading of the statement Cc-d indicates that Aristotle is aware of an epistemic gap between knowledge of (or acquaintance with) a particular and knowledge (or a grasp) of the universal subsuming it. Clause Cb-d in Passage C, accordingly, would be explanatory and, in a sense, justificatory. It would be an intended explanation of how acts of perceiving particulars (of the same kind, which lead to the formation of an experience consisting of multiple percepts in memory) *could* lead one to grasp the universal subsuming the particulars. As such, clause Cb-d would be justificatory

³² Michael Ferejohn in “Empiricism and the First Principles of Aristotelian Science,” in Georgios Anagnostopoulos, ed., *A Companion to Aristotle* (West Sussex, UK: Blackwell Publishing Ltd., 2009), 66-80, expresses a view that *seems* similar. (Any further reference to Ferejohn (2009), unless otherwise noted, will be to this work.) Ferejohn reads Passage C as saying that while the *object* of sense perception is the particular, the *content* is (also?) the universal (Ferejohn (2009), 71-2). I have already argued against the claim that the sense perception of a single particular is always enough for one to grasp the universal. Ferejohn, however, does not clearly ascribe this thesis to Aristotle. His reading of Passage C seems to imply that often after perceiving with one’s senses *more than one* particular of the same kind, one will grasp the universal with the aid of one’s intellect, and so the content provided by sense perception is *both* the particular and the universal. If this is the import Ferejohn’s reading of Passage C, his reading is, in my view, unassailable.

in the sense that it would indicate why a universal concept so grasped could be considered justified, i.e., veridical.

In regard to the evidence for this reading of statement Cd, let us consider three items. First, the phrasing of the “for clause” (i.e., Cb-e)³³ suggests an object-subject distinction between “the particular” (of which Callias is an example) and “the universal” (of which man is an example) respectively. Recall also my argument in Ch. 2 that “the particular” in statement Cc of clause Cb-d should be taken as the *object* of the act of perceiving.

Second, let us consider a passage from *APo.* A.31 which I think provides some evidence for my reading of Passage C:

[W]

[a] Understanding [*epistasthai*] is not through perception [*di' aisthêseôs*]. [b] For even if perception is of the such-and-such [*estin hê aisthêsis tou toioude*] and not of a this [*mê toude tinos*], nevertheless it is necessary to perceive a this [*aisthanesthai ge anankaion tode ti*] at some place and now. [c] It is impossible to perceive [*aisthanesthai*] the universal [*to...katholou*] and all-encompassing. (*APo.*, 87b28-31, trans. mine)

We should note that statement Wc explicitly states a position I had argued in Ch. 2 that Aristotle holds: that the universal cannot be perceived. Note that the sentence refers to the universal (i.e., “what is universal and holds in every case”)

³³ Recall again that my translation of clause Cb-d reflects the grammar of the Greek more closely than Barnes'. See fn. 1.

as the impossible *object* of sense perception.³⁴ Thus, the last sentence seems consistent with, and perhaps even suggestive of, my reading of clause Cb-d in Passage C.

Next, consider statement Wb. If we are to make sense of Passage W as an argument for or explanation of the first sentence in that passage—the sentence that understanding (*epistêmê*) cannot be obtained through perception—then the meanings of certain phrases in the second sentence are fairly clear. “[T]he such-and-such” (“*tou toioude*”) seems to refer to a *kind* of thing, what is a *universal*. Further, “a this,” seems to mean a particular, to something that, as the deictic expression suggests, can be pointed to. With this in mind, consider statement Wb again. Observe that in the expression “perception is of the such-and-such,” the phrase denoting the universal is in the genitive case, just as in the expression of statement Cd, which is about what perception is *of*. Further, observe that in the expression “it is necessary to perceive a this,” the phrase denoting the particular denotes the *object* of perception, just as in statement Cc. Just as clause Cb-d, statement Wb *suggests* that the particular is the *object* of perception, but that the universal is the *subject* (in the sense I mentioned earlier).

Given this suggestion of statement Wb, Passage W also suggests that the distinction between the object and subject of perception expressed in clause Cb-d of Passage C as I read it is not something novel or an anomaly for Aristotle, but a

³⁴ Note that “*to katholou*” (“the universal”) is the *object* of the verb “*aisthanesthai*” (“to perceive”).

settled, ordinary philosophical fact. This is important because if my reading of clause Cb-d in Passage C results in Aristotle holding the clause as a tenet that is not expressed or suggested elsewhere in his works, my reading is less plausible than it would be otherwise.³⁵ Thus, we can take Passage W as a confirmation of my reading of Passage C.

Let us now turn to the third item of evidence for my reading of statement Cd. The third item of evidence is that my reading of statement Cd contributes to a coherent reading of Passage C. As I have argued, taking the *adiaphora* mentioned in that passage as experiences (*empeiria*) rather than as particular percepts, combined with my reading of clause Cb-d as *not* claiming that the sense perception of a single particular is enough to grasp a universal, allows us to read Passage C in a way that is consistent with earlier parts of the genetic account. That is, such a reading allows for the formation of an *empeiria* between the sense perceptions of particulars and the grasp of a universal. My reading of statement Cd in turn allows us to read clause Cb-d in a way that is genuinely explanatory. For given my reading of clause Cb-d (including statement Cd), Aristotle recognizes that there is a gap between the sense perception of particulars and the

³⁵ As with the genetic account in B.19, one can raise the question about whether Passage W from A.31 is about particular and universal things or facts. As worded, the suggestion is that Passage W is about particular and universal *things*. For the phrases “a this” and “the such-and-such” suggest things. However, as with the genetic account, it is reasonable to take Passage W to correlatively be about particular and universal facts. For in perceiving a particular thing, such as Callias, one presumably correlatively perceives certain particular facts, such as the fact that Callias is here. Similarly, in grasping a universal thing, such as man, one presumably correlatively grasps certain universal facts, such as the fact that all (or most) humans have *logos*.

grasp of their universal kind, that how one can justifiably get the latter from the former needs explanation. Given my reading of clause Cb-d, the explanation is that while the object of perception is a particular, the subject (in the sense of what is represented by the perception of the particular) is the universal. For the act of perceiving the particular for Aristotle, as I have argued, consists of perceiving at least the particular form of the particular. And, given what I have argued above, namely that species forms for Aristotle consist in what the forms of particulars within the species have in common, the perception of the particular is thereby able to *represent* the universal. The perceptions of many particulars within a universal are retained in the soul as an *empeiria*. By virtue of the particular percepts *representing* the universal, the *empeiria* will eventually “make a stand,” i.e. become differentiated from other percepts and *emperia* in the soul so that universal form shared by the particulars comprising the *empeiria* becomes salient, which is the veridical grasp of the universal.^{36, 37}

³⁶ James Madden advances a similar view of how, according to Aristotle, a universal is grasped on the basis of sense perception. (James D. Madden, “Aristotle, Induction, and First Principles,” *International Philosophical Quarterly*, Vol. 44, No. 1 (March, 2004), 35-52.) According to Madden, it is because the senses receive the *form* of their object that they are able to instill the universal it instantiates in the soul (Madden, 44-6). Madden, however, seems to think that the senses directly receive the *species* form (Madden, 45). My reading is that the senses receive the *particular* form, and that particular forms instantiate, and thereby represent, universal (species) forms. Given the evidence I have provided that for Aristotle, only particulars are objects of the senses, it appears that my reading is more reasonable.

³⁷ Deborah Modrak holds a similar view of how, according to Aristotle, the universal is grasped from the sense perception of the particular. (Deborah K. W. Modrak, *Aristotle: the Power of Perception* (Chicago, IL: University of Chicago Press, 1987).) For Aristotle, according to Modrak, only particulars are perceivable and only universals are intelligible. But because particulars

Turning now to the issue of the grammar of statement Cd, I have argued in Ch. 2 that “*tou katholou*” in statement Cd should not be taken to be in the genitive of *object*. What genitive is it in then? Given my reading of statement Cd, it seems that the most reasonable answer is: genitive of *quality*. For given my reading of statement Cd as claiming that the universal is the subject (in the sense of what is represented) of sense perception, it seems that the clause is *qualifying* “the perception” (“*hê aisthêsis*”). For to say that sense perception is of the universal (in the sense just mentioned) qualifies sense perception, as the statement that this painting is of the Parthenon qualifies the painting. And given my suggestion that the claim from statement Wb that “perception is of the such-and-such” is parallel to statement Cd, it seems that we can say that “*tou toioude*” (“of the such-and-such”) from that claim is also in the genitive of quality.³⁸

Having given my reading of Passage C, we can now turn to my reading of the remainder of Passage B. Consider the two sentences of Bc. These two sentences apparently describe the acquisition of more concepts until a widest concept is reached. Presumably, the widest concept would be determined by the field in question. Given the examples of concepts (man and animal), the field

instantiate universals, the sense perception of particulars provides the intellect with the information needed to grasp the universal (Modrak, 120-3, 169-71).

³⁸ See Smythe, 313-320 for the uses of the genitive with a noun, and in particular, Smyth, 317 for the genitive of quality. My point in making suggestion above is simply that even if we do not take “*tou katholou*” from Passage C and “*tou toioude*” from Passage W to be in the genitive of object, we can still fit them into ancient Greek grammar.

seems to be biology. So, presumably, the widest “partless and universal” concept would be organism.³⁹

These two sentences may seem like an implausible description of concept acquisition, since our processes of concept acquisition are not always linear progressions from *infima* species to a *summum* genus. However, the two sentences do not have to be taken as *necessarily* describing a *linear* progression. Clearly, the examples of the concepts in the sentences suggest such a progression. But we do not have to take that to imply that every progression in concept acquisition from *infima* species to *summa* genera is linear. There could be acquisitions of concepts that are divisions of genera that one has already grasped. Aristotle in the two sentences, we could say, is just being simple for the sake of example.⁴⁰

As for statement Bd (which is also Passage A2), I have argued in Ch. 2 against Hamlyn that “*epagôgêi*” refers back to the genetic account. Note that

³⁹ “Partless” (“*amerê*”) at 100b2 seems to be an odd adjective, since, presumably, the widest concept would not be partless in the sense of having no species. The account of reaching it describes a process that *begins* with the acquisition (from sense perception, memory, and experience formation) of what are apparently (for Aristotle) *infima*-species concepts. We can, however, make some sense of the adjective “partless” if we remember that Passage B is a purported “clarification” of the rout metaphor in Passage V. Apparently, the re-formed routed side, after each soldier having made a stand, would be “partless” in the sense that its total strength would derive from each standing soldier contributing to it. So, presumably, “partless” as used at 100b2 to describe the widest concept means that the epistemic strength, i.e. veracity, of the widest concept derives from each narrower, constituent concept contributing to it. That is, each narrower, constituent concept, contributes to making the universal form behind the widest concept salient.

⁴⁰ It seems difficult, however, to escape the conclusion that for Aristotle, concept acquisition *does* involve a progression, i.e. that each “string” of concept acquisition *begins* with *infima* species and *ends* with a *summum* genus.

given Aristotle's description of *epagôgê* as reasoning from the particular to the universal (discussed in Ch. 2), and given my description of the genetic account as describing both the reasoning from particulars to universal *concepts*, and a correlative reasoning from particular facts to universal *propositional principles*, “*epagogeî*” in the last sentence of Passage B should be taken as referring to *both* the *conceptual* and *propositional* processes.

Finally, let us consider “placing” the process described by Passage B (and suggested by the rout metaphor in Passage V) within the process described earlier by the genetic account. Consider Passage U again:

[U]

[a] Thus from perception there comes memory [*mnêmê*], as we call it, and from memory (when it occurs often in connection the same item) experience [*empeiria*]; for [b] memories which are many in number form a single experience. [c] And from experience, or from all the universal [*tou katholou*] which has come to rest in the soul (the one apart from, i.e. whatever is one and the same in all these items), there comes a principle [*archê*] of skill [*technês*] or understanding—[d] of skill if it deals with how things come about, of understanding if it deals with how things are. (*APo.*, 100a3-9)

The process described by Passage B (and suggested by the rout metaphor in Passage V), reasonably, should be taken be the process *before* the grasping of the principle (*archê*) of skill or understanding, described by U_c. For recall that I had argued earlier that this *archê* should be taken to be a fundamental, true *proposition*, and the process described by Passage B (and suggested by the rout metaphor in Passage V) does not include an explicit description of the acquisition

of propositional truths. Thus, Passage B (and the rout metaphor in Passage V) can be seen as coherent with the above passage if the process thereby described is taken as not yet reaching the stage of propositional-truth acquisition.

This brings us to the end of the genetic account. Aristotle, by this point, has evidently answered the first of the two questions he posed at the beginning of *APo.* B19: how does one come to know the *archai*? Aristotle's answer, evidently, is: by *epagôgê* based on sense perception. The *epagôgê*, accordingly, is the means of reaching *and* justifying principles.

The rest of *APo.* B.19 (100b5-17) evidently offers an argument that *nous* is the state of knowledge (*gnôsis*) of the *archai*. As I have argued earlier, this evidently answers the second of two questions Aristotle asks at the beginning of the chapter: what is the state of knowing the *archai*? Aristotle's answer, evidently, is: *nous*. This indicates, again, that *nous* in the genetic account is not intended to be (all or part of) Aristotle's answer to the *first* question, i.e. that should not be taken as intuition that allows one to grasp a universal kind or truth, either without *epagôgê* or as an aid to secure *epagôgê*.

IV. Conclusion

It seems that the genetic account of *APo.* B.19 can and should be read in a coherent way, according to which *epagôgê* based on sense perception is how we come to know the principles (*archai*) of demonstration. On the reading I suggest,

the process begins with sense perception of particulars. Particular percepts retained in memory that are similar (i.e. of the same kind, such as man) are associated as a result of their being similar, forming an experience (*empeiria*). Such an experience is at first *undifferentiated* from other percepts and experiences in one's mind. But at some point, the experience becomes *differentiated*, i.e. the universal form of its particulars is distinguished from other forms (particular and universal) in one's mind. At that point, one has grasped the universal form, i.e., the concept (such as man). Evident in the particular percepts (and, as a result, in the universal) is one (or more) propositional definitional principle (such as "all (or most) humans reason") that reflects the distinctive universal form. Such, evidently, is the process of *epagôgê* based on sense perception that according to the genetic account is how we come to reach and justify principles of demonstration. Finally, *nous* is evidently Aristotle's answer to the question of what the state of knowing the principles is, and not intuition which allows one to grasp universal kinds or truths that are principles.

Chapter 5: A Defense of My Reading

I. Introduction

So far, I have argued against certain commentators (Ch. 2 and 3) to clear the way for my presentation for my own reading of the genetic account of *APo.* B.19, backed by some initial evidence (Ch. 4). I will now turn to providing a defense of my reading against conflicting readings.

My reading of the genetic account is intended to support my claim (discussed in detail in Ch. 7) that in the genetic account, Aristotle is aware of the problem of induction and has an implicit, putative solution to the problem. Given this, there are five crucial theses comprising my reading of the genetic account that need defense.

The first thesis is connected with Passage C, discussed in Ch. 2, 3, and 4:

[C]

[a] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular is perceived, [d] the perception is of the universal,--[e] e.g. of man, not of Callias the man. (*APo.*, 100a15-b1, trans. Barnes modified¹)

¹ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” This is done to make the translation more closely reflect the Greek.

The thesis is that the genetic account does not claim that the sense perception of a single particular is sufficient to grasp the universal it instantiates. As we have seen, an earlier part of the account claims that *many* percepts retained in memory form an experience (*empeiria*), and that a universal is grasped from an experience (*APo.*, 99b35-100a10). This thesis is important because it provides some evidence for my view of Aristotle's explanation of how we can grasp universals and certain definitional truths connected with the universals. My view, again, is that when an experience consisting of many particular forms (percepts) retained in memory becomes differentiated from other forms in one's mind, the universal form which all the particulars share becomes salient. This is the grasp of the universal, and allows us to grasp certain definitional truths connected with the universal. I have already provided my defense for this thesis in Ch. 2 on Hamlyn, Ch. 3 on Evans and Harari, and Ch. 4 on my reading of the genetic account. For this chapter, I will focus on defending the other theses.

The second crucial thesis is that the experiences (*empeiriai*) mentioned in the genetic account do not have as their object one particular, but many particulars. This is important, not only because it provides evidence for my reading of Passage C (as I discuss in Ch. 4), but, like my reading of Passage C, and in the same way, it provides evidence of my view of Aristotle's explanation of how we can grasp universals and certain definitional truths connected with the universals.

The third crucial thesis is my view of Aristotle's explanation of how we can grasp universals and certain definitional truths connected with the universals. My view is that the grasp of a universal from an undifferentiated item (*adiaphoron*), described in statement Ca above, consists in an experience that is undifferentiated from other forms in one's mind *becoming* differentiated, so that the universal form shared by the particulars comprising the experience is salient. This thesis depends on a view of what exactly an undifferentiated item is intended to be. Since my view and (as we will see) the view of certain other commentators is that the undifferentiated items are experiences, this thesis is very closely related to the second thesis. Hence, I will defend both of these theses in one section, Section II.

The fourth thesis pertains to the role of *epagôgê* in the genetic account. The thesis that *epagôgê* has the role of justifying the propositional principles. In Section III, I defend this thesis against T. Engberg-Pedersen's position that *epagôgê* in the genetic account has the role only of generalizing from cases and thereby allowing one to *arrive at* (but not secure) putative principles.

The fifth thesis is that *nous* in the genetic account is not intuition that allows one to grasp a principle (especially a universal truth), so that it solves the problem of induction (if *nous* is taken as a supplement to induction to strengthen it) or allows us to avoid any problem of induction (if it, rather than induction, is taken as means of grasping and securing principles). The importance of this thesis

is obvious. If we take Aristotle to hold in the genetic account that there is no problem of induction, this conflicts with my position that he thinks, in the genetic account, that there *is* such a problem. And, if we take Aristotle in the genetic account to hold that the solution to the problem is simply *intuition*, this conflicts with my view of what he holds, in the genetic account, to be the solution. I have argued in Ch. 3 against Evans' and Harari's versions of viewing *nous* in such a way. In Section IV, I will argue against certain other commentators who view *nous* in the genetic account in such a way.

Finally, in Section V, I will present my conclusion.

II. Experiences and Undifferentiated Items

I will turn now to my defense of the second thesis, the thesis that an experience (*empeiria*), as described in the genetic account, has for its object, not one, but many particulars.

It is clear that according to the genetic account, the acquisition of a principle begins with sense perception, and from memories of sense perceptions, experiences (*empeiriai*) are formed. After the controversies about sense perception (and whether a single sense perception can instill a universal), the next major controversy about the genetic account is the nature of these experiences. Typically, an experience is viewed as many percepts, grouped together in memory, of particulars of a given kind. So, it may include percepts of Callias,

Socrates, and other humans. In connection with *Met.* A.1, the percepts are often viewed as of facts. Accordingly, an experience will include percepts of the facts that Callias reasons, Socrates reasons, etc.²

This is typically how an experience as described by the genetic account is viewed (and how I view it, as my section on my positive reading of the genetic account indicates).

Greg Bayer, however, offers a view of these experiences that is unusual in a certain respect. According to Bayer, an experience consists of many percepts (retained in memory) of the same item, where an item is a single particular. In this view, an experience would consist, for example, of retained percepts of the facts that Callias is pale, Callias is bearded, Callias with a certain illness is curable by X, etc. (Bayer, 126).

The strength of Bayer's view is that it appears to give the genetic account a certain coherence. For it is rather implausible to consider Passage C to be describing a process of reaching a universal, from sense perception, which completely skips memory and experience. For as the genetic account indicates earlier, memory and experience are between sense perception and the grasp of a

² See *Met.*, 980b29-981a12. The example of an experience there is apparently one that consists of the retentions of the perceived facts that when Socrates is sick with X, he is cured with Y; when Callias is sick with X, he is cured with Y; etc. Regarding my example of an experience retaining the facts that Socrates reasons, Callias reasons, etc., such facts may seem non-perceptual, until we bear in mind that "*logos*" (the word typically translated as "reasoning") has the root sense of word. Bearing this in mind, it is easy to conceive of Aristotle as taking Callias reasoning and Socrates reasoning as more or less equivalent to Callias speaking and Socrates speaking, and taking these as facts perceived with the senses.

universal (see, again, *APo.*, 99b35-100a10). In Bayer’s view, Passage C does not describe a process in which memory and experience are skipped; it says that sense perceptions of a particular (such as Callias) retained in memory—i.e. an experience of Callias—instills a universal (such as man) in the soul (Bayer, 126-30). On this reading, Passage C *is*, as its text suggests, in a certain sense about the grasp of a universal from a single particular, but *not* in a sense in which memory and experience are skipped. Consider the passage again:

[C]

[a] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular is perceived, [d] the perception is of the universal,— [e] e.g. of man, not of Callias the man. (*APo.*, 100a15-b1, trans. Barnes modified)

According to Bayer, the undifferentiated item (*adiaphoron*) referred to by statement Ca is an experience (*empeiria*), which is of a particular, such as Callias. It consists of multiple facts about the particular, perceived and retained in memory.³ Statement Ca continues and says that from this undifferentiated item, one grasps a universal (such as man). The clause beginning with Cb then offers an explanation: “for although the particular is perceived” (i.e., the experience

³ In Bayer’s reading, each “undifferentiated item” is a grasp of attributes of a single particular, attributes such as Callias is bearded, Callias is pale, etc. The attributes are “jumbled together,” i.e. “undifferentiated,” in the mind of the person who grasps them. Such an undifferentiated experience, according to Bayer, when ‘making a stand’ suggests a universal such as human. This is part of the process of *epagôgê*, which according to Bayer, is fallible (Bayer, 123-30). Bayer, apparently, considers the grasp of propositional principles as a step in addition to the epagogic grasp of universal concepts, and thinks that Aristotle, recognizing the problem of induction, regards *epagôgê* as too frail to secure the truth of the foundational propositional principles of demonstration, which is grasped by *nous* as intuition (Bayer, 130-41).

consisting of percepts is of a particular object of perception), “the perception is of the universal” (i.e., that particular object of experience must be viewed as a member of a universal, such as man, which gets implanted in the perceiver’s soul).

Further, it is perhaps natural to take the soldiers in the rout metaphor as representing particulars, since each is himself a particular (an individual human). Bayer’s reading allows each soldier in the rout metaphor to represent a particular—or rather an experience of a particular—in the “restatement” at *APo.*, 100a15-b5, which includes Passage C. Hence, in this reading, the soldiers in the rout metaphor *do*, in a certain way, represent particulars, and it perhaps seems clear *how* it is a metaphor of the process described in the subsequent “clarifying” passage.

I will make three points about why my view of the “experiences” (*empeiria*), which are the “undifferentiated items” (*adiaphora*) in both of our readings, is preferable to Bayer’s view. The first is that his view is not, as a result of its attempt to take each soldier to represent a particular, as plausible as it might first seem. Let us consider this.

I agree with Bayer that the *adiaphora* are each represented by a soldier. As I have indicated in my positive reading, Aristotle’s description of the soldiers and

the *adiaphora* as both “making a stand”⁴ seems to demand that we treat a soldier as analogous to an *adiaphoron*. I further agree that an *adiaphoron* is an (undifferentiated) experience. But, again, my view of an experience is that it consists of many percepts, retained in memory, of the same item, where an item is *not* a single particular, but a kind (such as man). Hence, in my view, an experience will consist of percepts where each will likely be of a different particular (e.g., Socrates, Callias, etc.) of the same kind (e.g., man). Accordingly, in my view, each soldier represents an experience, and as a result, a collection of particulars, rather than a single particular. Because in my reading, a particular soldier does not represent a particular, but a collection of particulars of a given kind (such as man) retained in memory, Bayer’s reading may seem more plausible than mine.

However, even on Bayer’s reading, *every* soldier in the passage of the rout metaphor cannot be taken to represent a particular. For in the clarifying passage afterwards, among the things that Aristotle describes as “making a stand” are clearly universals such as man and animal. Here again is the passage (that includes Passage C) that seeks to clarify the rout passage:

⁴ Again, this should be understood in connection with Aristotle’s claim that the passage after that of the rout metaphor is a clarifying restatement of that earlier passage.

[B]

[a] Let us say again what we have just said but not said clearly. [b] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; for although the particular is perceived, the perception is of the universal,—e.g. of man, not of Callias the man. [c] Next, a stand is made among these items, until something partless and universal makes a stand. E.g. such-and-such an animal makes a stand, until animal does; and with animal a stand is made in the same way. [d] Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which perception instills the universal. (*APo.*, 100a14-b5, trans. Barnes modified⁵)

Passage Bc appears to describe universals like man, horse, dog, etc. each “making a stand” until animal does, and then animal and, presumably, plant making a stand until, presumably, organism does, etc. Hence, if we take each of the soldiers “making a stand” in the rout metaphor to be analogous to something “making a stand” in the following “clarifying” passage (Passage B), each soldier will not represent a particular mentioned by Passage B. Some soldiers will each represent a universal mentioned by Passage B.

To defend Bayer, one may object that what Aristotle *means* is that the experiences, each of a particular, *behind* the universals such as man and animal “make a stand.” But this objection is not plausible with regard to animal “making a stand” (which Aristotle mentions at *APo.*, 100b3). For as Passage B indicates, the cognitive items directly behind the grasp of animals is kinds of animals (man,

⁵ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” In the last sentence, “universal” replaces Barnes’ “universals.” This is done to make the translation more closely reflect the Greek.

horse, etc.), and apparently not experiences. And Aristotle does mention animal “making a stand”—as though it were a separate step, not just the same step as man, horse, etc. each making a stand. Hence, on Bayer’s reading, one or more of the soldiers need to be taken as representing universals. As a result, Bayer’s view can hardly count for greater plausibility if only *some* of the soldiers in the rout metaphor represent particulars. For, aren’t *all* the soldiers, by nature, particulars (i.e., individuals)?

My view, again, is that Aristotle did not intend a soldier to represent a particular, and that this is part of the reason he begins Passage B with the sentence: “Let us say again what we have just said but not said *clearly*” (*APo.*, 100a14, emphasis is added).

A second point in support of my view is that it gives a plausible account of how Aristotle could think that one derives a universal from sense perceptions of particulars. Again, in my view, an undifferentiated experience making a stand is its *becoming* differentiated, i.e. its universal form becoming distinguished from the forms of other things in the soul, and as such, becoming salient. Similarly, an undifferentiated set of universals—such as man, horse, dog, etc.—making a stand is their becoming differentiated, i.e. their universal form becoming distinguished from other forms in the soul, and thereby becoming salient. (This is related to Aristotle’s awareness of and attempted solution to the problem of induction, which I discuss more Chapter 7.) Bayer’s reading does not give such an account,

except (like many commentators) by taking *nous* as intuition that grasps the universal (Bayer, 137-41). I have objected to this view in my response to Evans and Harari, and will discuss it more in Section IV below.

A third point in favor of my view of experiences is a certain passage from *Met.* A.1, where Aristotle discusses the nature of experiences. Consider this passage:

[W]

...from memory experience [*empeiria*] is produced in men; for many memories of the same thing produce finally the capacity for a single experience. Experience seems very similar to science [*epistêmê*] and art [*technê*], but really science and art come to men *through* experience... And art arises, when from many notions gained from experience one universal [*katholou*] judgment about similar objects is produced. For to have a judgment that when Callias was ill of this disease this did him good, and similarly in the case of Socrates and in many individual cases, is a matter of experience, but to judge that it has done good to all persons of a certain constitution, marked off in one class, when they were ill of this disease, e.g., to phlegmatic or bilious people when burning with fever,—this is a matter of art. (*Met.*, 980b29-981a12)

Aristotle here is evidently describing part of the same process as in the genetic account of *APO.* B.19. For the passage above mentions a transition from memory to experience to *technê* or *epistêmê*. And, it is evident that Passage W takes sense perception as the cognitive base of the process, as the passage just above it (at *Met.*, 980a27-b29) states that animals by nature have sense perception, that some have memory, and little of connected experience, and that non-human animals have to live by these *alone* and not by *technê*. Further, note that in the examples

the passage gives to illustrate the process, *two* men, Callias and Socrates, are mentioned. Clearly, if the experience being formed is of men, then this example of an experience indicates that, contrary to Bayer, an experience is not just of one particular, but of more than one particular of the same kind.

Bayer might object that there is no need to take the above passage as giving as an example just one experience, that we can and should take Callias and Socrates as each subsumed by a different experience.⁶ But there is some reason to think that the example in Passage W is about just one experience. First, in the phrase “from many notions gained from experience,” “experience” (*tês empeirias*) is in the singular. The same is true of the word “experience” in the part of the sentence that *mentions* both Callias and Socrates: “...to have a judgment that when Callias was ill of this disease this did him good, and similarly in the case of Socrates and in many individual cases, is a matter of experience [*empeirias*]...” Second, as I have indicated, this passage seems parallel to the passage in *APo.* B.19 at 100a3-9 (Passage U, presented in Ch. 4) which describes the transition from sense perception to memory to experience to the universal. Consider this clause in the latter passage: “...for memories which are many in number form a *single* [*mia*] experience” (*APo.*, 100a5-6, emphasis is added). This is parallel to the first sentence from the Passage W which says: “...for many memories of the same thing produce finally the capacity for a *single* [*mias*]

⁶ This is how Bayer seems to take this passage from the *Metaphysics* (Bayer, 123-6).

experience” (emphasis is added). These clauses indicate that Passage U at *APo.*, 100a3-9, as well as Passage W at *Met.*, 980b29-981a12, are each about *one* experience obtained from multiple memories. Accordingly, it is more plausible to take Passage W as about one experience obtained from multiple memories. In Passage W, Callias and Socrates (and other individual men) should accordingly be taken as subsumed by the same experience. Hence, Passage W is strong evidence that the experiences (*empeiriai*) that the genetic account of *APo.* B.19 discusses each consist of *more than one* particular of the same kind, retained in memory.

Bayer has a view of an experience (*empeiria*) contrary to my own, which is the more commonly accepted view. However, my view of the grasp of the universal—the third crucial thesis in my reading—is not as commonly accepted. My view of the grasp of the universal, again, is that the grasp consists of an undifferentiated experience *becoming* differentiated (i.e., “making a stand”), which is its universal form becoming differentiated from other forms in one’s mind. At that point, one has grasped primitive universal form, i.e. the *infimae* species, of the particulars subsumed by the experience. As is evident, this view depends on a view of what exactly an “undifferentiated item” (*adiaphoron*) is.

I have already argued against the claim that according to the genetic account the sense perception of a single particular is enough to instill a universal in the soul. I will now consider some other views, conflicting with my own, of how the universal is grasped. This will consist, in part, in considering views of

exactly what the undifferentiated items (*adiaphora*) mentioned in Passage B are intended to be.

A common view (one held by Ross, Barnes, and McKirahan) is that an undifferentiated item is *infimae* species, as an *infimae* species is “undifferentiated” in a certain sense: it is not a genus internally differentiated into narrower species. For support of this view, the mention of undifferentiated items at *APo.*, 97b31 is often cited.⁷

One problem with this view is a reading of a certain part of the genetic account that seems to necessarily result. Consider Passage C again:

[C]

[a] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular is perceived, [d] the perception is of the universal,--[e] e.g. of man, not of Callias the man. (*APo.*, 100a15-b1, trans. Barnes modified)

With this view of undifferentiated items (*adiaphora*), statement Ca seems to be redundant, i.e. to say: when there is a simple concept in the soul, there is a simple concept in the soul. One of the consequences of such redundancy is a lack of explanation. Recall again that this part of the genetic account is intended to be a clarifying restatement of the passage of the rout metaphor. That passage is intended, through the metaphor, to *explain* how one arrives at a principle; thus, we should expect Passage C and the statements surrounding it to do the same. But to

⁷ See Ross, 674-5, McKirahan (1992), 245, and Barnes (2002), 266, 249-50,

say that when there is a simple concept in the soul there is a simple concept in the soul is non-explanatory.

Note that, given my reading, this problem does not occur. An “undifferentiated item” here is an experience, which is memories of percepts of particulars of the same kind mentally connected on the basis of similarity. But at this stage, the percepts and the experience are *undifferentiated* from other things in one’s mind. The experience “making a stand” is its *becoming* differentiated, the universal form instantiated by the particulars of the experience becoming *distinguished* (and thereby salient) from other forms in one’s mind. (Only at this point is there a differentia or the need for a differentia between the resulting universal and some wider genus *implied*; when one explicitly formulates a definition, one seeks an *explicit* differentia. Hence my view, just as the more common one, has the virtue of connecting Aristotle’s use of the term “undifferentiated item” to the term “differentia” referring to a part of a definition.) Clearly, my reading of the statement in Passage C before the “for” clause makes it more explanatory.

Further, consider the textual evidence cited for this at *APo.*, 97b7-9 and b31. This chapter (B.13) is concerned with finding definitions through making divisions. Consider the first passage:

[X]

You should look at items which are similar and undifferentiated [*adiaphora*], and first seek what they all have in common. (*APo.*, 97b7-9)

Consider the second passage:

[Y]

[a] Every definition is always universal [*katholou*]: doctors do not say what is healthy for some particular [*tini*] eye, but rather for every eye or else for some determinate form of eye.

[b] It is easier to define the particular [*to kath' hekaston*] than the universal (that is why you should move from the particulars [*tôn kath' hekasta*] to the universals). [c] For homonymy more often escapes notice among universals than among undifferentiated items [*tois adiaphorais*]. (*APo.*, 97b25-31)

For Passage Y, Barnes takes “particular” and “particulars” in statement Yb to refer to *infimae* species rather than to individuals. The main evidence cited for this is statement Ya, which says that all definitions are universal. This suggests that by “particular” and “particulars” in the next sentence, Aristotle does not mean *ultimate* particulars, but *relative* particulars, i.e. *infimae* species. And since “undifferentiated items” (*adiaphora*) in statement Yc seem to be the “particulars” referred to by Yb, there is a suggestion that the undifferentiated items are *infimae* species.⁸ (And, hence, there is evidence that the undifferentiated items mentioned

⁸ Statement Yc appears to use the concept of homonyms (“*homônumiai*”) to refer to, not *words*, but two or more *things* (whether ultimate particulars or universal kinds) that are different in definition but denoted by the same word. Aristotle appears to use the concept similarly elsewhere. See, for example, *Cat.*, 1a1-6.

by Passage X are also *infimae* species.) In turn, Barnes takes Passages X and Y as evidence that the “undifferentiated items” in Passage C are *infimae* species (Barnes (2002), 248, 249-50, 266).⁹

In response to this, we should note that it is questionable whether “particular” and “particulars” in statement Yb refer to *infimae* species rather than ultimate particulars. For even if we take those words to refer to ultimate particulars, Passage Y can still be read in a coherent way. The way to do that is to read the phrase “define the particular” in statement Yb as meaning define, together, all particulars that are in a given species.

But even if we treat those instances of “particular” (and its inflection) in Passage Y as referring to *infimae* species, we can still take “undifferentiated items” in Passages X and Y to refer to ultimate particulars that are undifferentiated from each other (i.e., are in the same *infimae* species). For this does not appear to undermine at all the coherence of either passage.

But whether “undifferentiated items” in the first passage and in the second sentence of the second passage refer to ultimate particulars or *infimae* species, my view is that it is not very relevant to how “undifferentiated items” in *APo.* B.19 should be understood. For the context of usage in *APo.* B.13 is evidently significantly different from that of *APo.* B.19. B.19, again, is fairly clearly about the *acquisition* of concepts (and correlatively of propositions of a sort). In this

⁹ Ross similarly takes the undifferentiated items mentioned in Passage C and *APo.* B.13 to be *infimae* species (Ross, 655, 677). McKirahan holds the same view (McKirahan (1992), 245).

context it makes sense to speak of an experience from being undifferentiated *from other forms* in one's mind. It's *becoming* differentiated (i.e. its 'making a stand', its universal form becoming salient) serves to *explain* how one can come to know a universal from sense perceptions of particulars. B.13, on the other hand, is evidently about finding explicit definitions of concepts *one already has*.¹⁰ If one seeks to prescribe guidelines for reaching an explicit definition of such a concept, it is apparently useful to refer (as Aristotle seems to be doing), in order to indicate the items for which a commonality should first be sought, to individuals that are undifferentiated *from each other* (i.e. are in the same species) or to *infimae* species that are each *internally* undifferentiated. We should, in other words, expect answers to the questions of *how* or *from what* an item is undifferentiated to change as the context (and in particular, the nature of the "item" in question) demands.

¹⁰ A clear indication of this is a passage in *APo.* B.13 where Aristotle considers, as an example of finding a definition, finding the definition of magnanimity: "I mean, e.g., that if we were seeking what magnanimity is, we should inquire, in the case of some magnanimous men we know, what one feature they have in common as such" (*APo.*, 97b16-8). Aristotle then proceeds to consider Alcibiades, Achilles, and Ajax as examples of magnanimous men (*APo.*, 97b18-25). The passage that considers finding the definition of magnanimity as an example of finding a definition, says that "we should inquire, in the case of some magnanimous men we know..." This indicates that in the example, the definer(s) already *has* the concept of magnanimity, that he or she should consider *magnanimous* men, i.e., predicate the concept magnanimous to some men one knows, and consider what they have in common. Obviously, one cannot predicate a concept one does not *have*. This example indicates that the theoretical discussion of finding definitions beginning at *APo.*, 96a20 (the beginning of Ch. B.13) of finding definitions through division assumes that the definer(s) *has* the concept he or she seeks to divide and define. For one cannot try to divide a kind that one does not grasp.

Robert Bolton in “Aristotle’s Method in Natural Science” also upholds an uncommon view of “undifferentiated items.” I find much in Bolton’s paper to be agreeable, especially his view that the acquisition of principles as described in *APo.* B.19 is intended to be an inductive, inferential process.¹¹ I disagree, however, with his view of the nature of an “undifferentiated item,” and connected with this, his view of the nature of an “experience,” and a “universal” (*katholou*) in *APo.* B. 19.

Bolton holds that the “undifferentiated items” of Passage C are “experiences,” a claim with which I agree. He thinks, however, that what these “undifferentiated items” and “experiences” are should be understood in the light of *Phys.* I.1 (Bolton, 4-9). According to *Phys.* I.1, what is “more familiar to us” (as against “more familiar in nature”) is what is *katholou*, which Aristotle in that chapter describes as a “compounded” mental content, i.e. a whole consisting of parts that have not yet been distinguished from each other (*Phys.*, 184a1-26). Aristotle in that chapter gives two examples of such a content. The first is the notion denoted by “circle,” which Aristotle says includes many things before they are distinguished from each other. The second is the notions a young child denotes by “mother” and “father.” Aristotle says that young children refer to all women as “mother” and all men as “father” until they distinguish the persons to

¹¹ See Bolton (Bolton, 4-5) and especially fn. 4 on p. 5.

whom “mother” and “father” correctly refer from whom they do not (*Phys.*, 184a26-b5).

According to Bolton, an “experience,” “undifferentiated item” and “*katholou*,” as described in *APo.* B.19, should be understood as such a mental “compound” (Bolton, 5-9). It is by analyzing such compounds into parts that one obtains principles, and this (presumably) is part of the *epagôgê* mentioned in that chapter as the means to acquiring a principle.¹²

Bolton presents an internally coherent view of how to understand the genetic account. My argument against Bolton’s view is that we should prefer my reading because it is also internally coherent and preferable in some respects to Bolton’s view.

Part of the reason Bolton gives for reading *APo.* B.19 in light of *Phys.* I.1 is that according to Aristotle, the scientist’s justification of principles cannot be dialectical. And though much of *The Physics* (including the very next chapter, I.2) seems to argue dialectically, Bolton reasons that this is not because Aristotle thinks that a dialectical justification of principles is sufficient for the scientist. Rather, it is because dialectical arguments—arguments that proceed from a

¹² Presumably, an example of the process, according to Bolton’s reading of the genetic account, would be to begin with a jumbled mental compound one denotes with the word circle. This is the “undifferentiated item” (*adiaphoron*). The compound includes ovals, ellipses, and other non-circles. One then analyzes it into parts, and recognizes that the ovals, ellipses, etc. are unlike circles, and sets them aside. Once the word “circle” in one’s mind denotes only circles, one can then arrive at a definitional principle, like: any circle has all of its points on its edge an equal distance from its center.

consideration of *endoxa*—are appropriate for addressing past scientists such as Parmenides and the other Eleatics.¹³ This is part of the reason Bolton thinks that *Phys.* I.1, which seems to be about the acquisition and justification of principles, should be read as discussing the same topic as *APo.* B.19, and not, as others have thought, as discussing the discovery of principles in the context of dialectical, as against demonstrative, reasoning (Bolton, 13-9).

One problem with Bolton’s reading of *APo.* B.19 in light of *Phys.*, I.1 is that *Phys.* I.1 appears to contradict, in a certain way, a chapter from the same work as *APo.* B.19, Ch. A.2. On the one hand, *Phys.* I.1. implies that the *katholou* is “more familiar to us,” and the *kath’ hekasta* are “more familiar in nature” (*Phys.*, 184a16-26). On the other, *APo.* A.2 implies the reverse (*APo.*, 71b34-72a6). Bolton recognizes that *Phys.* I.1 appears to contradict *APo.* A.2. Bolton’s way of reconciling the two is to understand “*katholou*” in *Phys.* I.1 in the way I indicated and translate it as “comprehensive,” while translating “*to kath’*

¹³ Bolton thinks that Aristotle is aware that Parmenides, for example, would not accept a non-dialectical inductive argument, based on sense perception, that change exists, precisely because Parmenides would consider the sense perception intended to ground the particular premises to be deceptive. But Parmenides could not be expected to accept any of the *endoxa* from which a dialectical argument proceeds, either. Bolton, however, does not think that Aristotle would consider others’ rejection of such *endoxa* a problem. For he thinks that, for Aristotle, certain acceptable *endoxa* are, by the very nature of dialectic, the starting point of dialectic argument. If Parmenides or other scientists refuse to accept them, they are simply refusing to do proper dialectic. This, Bolton thinks, is why much of the *Physics* argues dialectically (Bolton, 13-9).

hekaston” in that chapter as “specific” (in the sense of a specific part) (Bolton, 2-4).¹⁴

For my response to Bolton, consider another way of reconciling *APo.* A.2 and *Phys.* I.1. We can read *Phys.* I.1 as about the acquisition of principles in a dialectical, as against demonstrative, context, while recognizing that *APo.* A.2 assumes a demonstrative context.¹⁵ On this view, we can keep the common translation of “*katholou*” as “universal” and of “*kath’ hekasta*” as “particulars” for both chapters.

Bolton may object that that the *Physics* is a work of a certain science or *epistêmê* (namely, that of nature), and that Aristotle does not think that a scientist’s justification of principles can be dialectical. Though I agree with Bolton that Aristotle thinks that a scientist’s justification of a principle cannot be dialectical, it is reasonable that an Aristotelian scientist could think that dialectic is, in a certain sense, a means to arriving at principles. This is the sense of dialectic allowing a scientist to distinguish principles from non-principles. Again, on my reading of the genetic account of *APo.* B.19, a person acquires principles (of science, i.e. *epistêmê*, and craft, i.e., *technê*) through *epagôgê* based on sense perception. But, as I have indicated, *APo.* A.4 requires that predications in the

¹⁴ Apparently, for *APo.* A.2, Bolton thinks we should keep the common translations of “*katholou*” and “*kath’ hekasta*,” i.e. “universal” and “particulars” respectively (Bolton, 4).

¹⁵ The stated subject of the *Analytics* is demonstration: “We must first state what our inquiry is about and what its object is, saying that it is about demonstration and that its object is demonstrative science” (*APr.*, 24a10-2).

ultimate premises of demonstration meet certain requirements. The predications must be definitional. In order to distinguish real principle premises, i.e. those that have definitional predications as per *APo.* A.4, from other generalizations one has obtained from sense perception and *epagôgê*, we need to arrive at explicit definitions of concepts. The role of dialectic would be to help a prospective scientist arrive at and test a definition of a concept, and thereby distinguish a principle premise connected with that concept from non-principles. To determine whether “all (or most) humans reason,” for example, is a real principle of demonstration, one would seek to dialectically find and test the definition of man.¹⁶ If through the testing, one recognizes “rational” as the correct differentia of man (and, perhaps, mammal as the genus), one would, presumably, recognize that that the predication in the putative propositional principle is definitional and satisfies the requirements set by *APo.* A.4 for a principle of demonstration.¹⁷ By contrast, the generalization that all (or most) humans can use tools, would presumably, fail the requirement of its predication being definitional. This is a use of dialectic that does not consist in seeking to *justify* a principle of science (as,

¹⁶ *APo.* B.13, discussed above in connection with Barnes, appears to be about a positive dialectical process of finding definitions through a method of divisions, while *Top.* VI appears to be about testing definitions in dialectic to see if they satisfy certain criteria.

¹⁷ One of the criteria set by *APo.* A.4 is that a predication in a premise of demonstration hold “in every case” (“*kata pantos*”), (*APo.*, 73a24-35). This seems to contradict the claim of Ch. B.12 (*APo.*, 96a8ff) that some principles that hold only “for the most part.” (See Ch. 1, fn. 8.) But to make the *Posterior Analytics* internally consistent, it seems that the latter claim *needs* to be interpreted as relaxing the “in every case” (“*kata pantos*”) requirement of Ch. A.4 (for, perhaps, some kinds of principles, such as those about terrestrial living beings).

again, I agree with Bolton that Aristotle does not think that the scientist's justification of principles would be dialectical). It would rather be used to distinguish principles of *epistêmê* from generalizations that are not principles of *epistêmê*, and presupposes that the scientist has already acquired some concepts and general propositions as described by the genetic account of *APo.* B.19. Again, the justification of a principle of science (*epistêmê*), as per my reading of the genetic account, would be *epagôgê* based on sense perception.

This is my reading, and it is also internally coherent. But why should we prefer my reading? Here are two reasons why.

First, it would be rather sloppy of Aristotle if *APo.* A.2 and *Phys.* I.1 employ the same language (i.e. “more familiar to us” vs. “more familiar in nature” or in an unqualified sense, and “*katholou*” vs. “*to kath' hekaston*”), both in the context of demonstrative reasoning, and yet seem to blatantly contradict one another. For again, *APo.* A.2 claims that the *kath' hekasta* rather than the *katholou* is more familiar to us. *Phys.* I.1 claims the reverse.

We could instead take Aristotle to change his mind by the time of writing *Phys.* I.1. But, evidently, the more charitable interpretation is my own. It avoids ascribing to Aristotle such a sharp change of mind. And because it reads the two chapters as assuming two different contexts (demonstrative reasoning for *APo.* A.2 and dialectical reasoning for *Phys.* I.1), the appearance of a blatant contradiction between the two is gone. *APo.* A.2, again, appears to assume a

context of demonstrative reasoning. Its claim at 71b34-72a6 is, that the *kath' hekasta* (particulars) are more familiar *to us*. In my view, it is because they can be perceived directly with our senses. The *katholou* (universal), by contrast, cannot be directly perceived by us.¹⁸ We must arrive at the *katholou* by reasoning (specifically, *epagôgê* based on sense perception which is what my reading of the genetic account of *APo.* B.19 describes). But, if in *Phys.* I.1, Aristotle is, as I claim, assuming a context of dialectical reasoning, using division to find definitions, then we can make sense of its claim that the *katholou* (universal) and not the *kath' hekasta* (particulars) is more familiar to us. For in *dialectical reasoning*, in the process of dialectical division, we *begin* with a universal concept, and through a method of division, we analyze it into particulars. The particulars may be particular species or ultimate particulars. We may continue the process of division until we reach ultimate particulars. But dividing a concept into the particular species or ultimate particulars it subsumes must be done before we can ask what they have in common, a question which is part of the process of finding a definition.¹⁹ We also need to use the method of division to find the differentia within the genus of the concept we are defining.²⁰

¹⁸ This is supported by the evidence I present in Ch. 2 that for Aristotle, only particulars are objects of sense perception.

¹⁹ *APo.* B.13, discussed in connection with Barnes, appears to describe such a process at 97b6-31.

²⁰ This seems to be discussed in *APo.* B.13 at 96b26-97a23. Testing to determine whether one has identified the correct differentia is discussed in *Top.* VI, especially in Ch. VI.6.

More generally, the process of taking apart a mental compound, if it is a process of induction, seems more naturally like part of a dialectical process than that of a non-dialectical process of inductive discovery. And in my interpretation, the former is exactly what *Phys.* I.1 intends the process to be, whereas *APo.* B.19 intends it to be the latter.

Second, and connected with this, it would be preferable to translate “*kathalou*” and “*to kath’ hekaston*” one way rather than two in order to make a claim using these terms in *APo.* A.2 consistent with another, apparently conflicting claim using these terms in *Phys.* I.1. Bolton does the latter. I do the former, as I have just indicated above. In my reading, we can translate “*katholou*” as “universal” and “*to kath’ hekaston*” as “particular” in both *APo.* A.2 and B.19.

Let us now turn to defending my fourth crucial thesis, which is about the role of “*epagôgê*” in *APo.* B.19. To do this, we need to consider a certain view of “*epagôgê*” in that chapter.

III. The Role of *Epagôgê*

In responding to Harari, I have indicated that for Aristotle, the genus of *epagôgê* is *logos*, and though in the *Topics* he defines dialectical *epagôgê* as a species of dialectical *logos*, it is not plausible that he thinks that all *epagôgê* is dialectical. But the view of *epagôgê* as described in the genetic account for which I will give a more lengthy consideration is that of T. Engberg-Pedersen.

T. Engberg-Pedersen in his article “More on Aristotelian Epagoge,” has denied that *epagôgê* for Aristotle involves an inference. In what follows, I will present Engberg-Pedersen’s essential argument for this position, and then criticize the argument. As will be seen, I agree with many of John Upton’s criticisms, in his article “A Note on Aristotelian Epagoge,” of Engberg-Pedersen’s argument.

Engberg-Pedersen bases his position on an analysis of two terms in Aristotle’s works: “*epagôgê*” and “*nous*.” Engberg-Pedersen thinks there are several senses of “*epagôgê*” in Aristotle’s works, but that they are all related in a certain way. According to Engberg-Pedersen, none of these senses refer to a process of inference, but rather refer to a process of gaining “insight” into something, often a universal term or universal proposition.

Engberg-Pedersen thinks that there is evidence of one of the senses of “*epagôgê*” in the *Prior Analytics* before Ch. B.23 and in the *Posterior Analytics* (Engberg-Pedersen, 303).²¹ This is the sense of: “leading another person into something with the aim and consequence that he acquires insight into it” (Engberg-Pedersen, 301). Engberg-Pedersen argues that this is the sense that leads to other, more advanced senses that Aristotle held. So, we should consider this to be the primary sense of “*epagôgê*” for Aristotle (Engberg-Pedersen, 301-2).

Engberg-Pedersen discusses what he thinks are other senses, based on his identification of the primary sense. For example, he thinks that the first sense

²¹ He cites *APr.* B.21, 67a23 and *APo.* A.1, 71a21 and 24.

leads to a second one: “leading another person towards something *katholou* or universal with the aim and consequence that he acquires insight into it” (Engberg-Pedersen, 301). And he thinks that the second sense leads to a third one: “leading another person, by pointing to particular cases, towards something *katholou* with the aim and consequence that he acquires insight into it” (Engberg-Pedersen, 301). Engberg-Pedersen identifies six such related senses and tries to provide textual evidence for each.

For the senses of “*epagôgê*” that refer to gaining an insight into a universal truth, Engberg-Pedersen takes Aristotle to take “*nous*” to have a sense that refers to a faculty with a role in the process. According to Engberg-Pedersen, the relevant sense for Aristotle is that of only a generalizing faculty that does not certify its generalizations. Indeed, any immediate result of *epagôgê* and *nous* may be either true or false (Engberg-Pedersen, 310-11). The generalization, based on a few examples—and often just one or two—should, however, be held on to until and unless one is confronted with counter-examples (Engberg-Pedersen, 311). It is *nous* in such a role that is the “*insight*” in a process of *epagôgê* that consists of being led to a universal proposition (Engberg-Pedersen, 307, 310-1).

The implication of such an account of *epagôgê* and *nous* is that *epagôgê*, for Aristotle, is not inferential. It is rather intuitional. When one performs an *epagôgê* that consists of considering one, two, or a few particular facts, one does not *infer* any universal truth. Rather, one may have an *insight* into a generalization

based on the facts, a generalization which may or may not be true, but which one should hold on to until and unless counter-examples are produced.

Engberg-Pedersen is aware that *APr.* B.23 is often read in a way that makes *epagôgê* perfect induction, and as such, inferential (indeed, a type of *sullogismos*). Engberg-Pedersen, however, thinks that that chapter ought to be read in a way that is consistent with his own non-inferential view of Aristotelian *epagôgê*.²²

Upton, in “A Note on Aristotelian Epagoge,” criticizes Engberg-Pedersen’s position, and I essentially agree with Upton’s criticisms. The central criticism that Upton levels against Engberg-Pedersen is that the position that *nous* for Aristotle is *only* a generalizing faculty is false. Upton points out (Upton, 173) that even if Engberg-Pedersen is correct that *nous* for Aristotle is a generalizing faculty as per *DA*,²³ Engberg-Pedersen’s evidence that *nous* in the context of an *epagôgê* is *only* supposed to be a generalizing faculty is inconclusive and as such

²² Engberg-Pedersen’s reading of *APr.* B.23 is based on his view of Aristotelian “*epagôgê*” and “*nous*” which he argues for earlier. Because my criticism is of this basis—Engberg-Pedersen’s view of Aristotelian “*epagôgê*” and “*nous*”—I do not discuss his reading of *APr.* B.23 in detail here. Essentially, he thinks that *APr.* B.23 has to be read as follows. Before we perform the “deduction from induction,” we must know that B (bile-less) holds of all C (individual long-lived species) and only of C. However, *APr.* B.23 is not concerned with *how* we come to know these, and in particular, does not claim that we come to know these by a complete enumeration of all long-lived and gall-less species. See Engberg-Pedersen, 311-4. This makes the reading consistent with Engberg-Pedersen’s view of Aristotelian “*epagôgê*” and “*nous*” discussed above.

²³ Actually, Engberg-Pedersen does not cite any particular passage in *DA* to support this view, but makes only a passing and general reference to *DA* III.4ff (Engberg-Pedersen, 308). The discussion of *nous* (the intellect) in *DA* does not explicitly claim that *nous* is a generalizing faculty.

unconvincing.²⁴ Indeed, as Upton points out (Upton, 173-4), Engberg-Pedersen's own account of *APo.* A.31 indicates that for Aristotle, *nous* helps provide *knowledge*: it enables one to recognize the *true* general causes of burning glass and eclipses, not just reach generalizations that may or may not be true. But Engberg-Pedersen evidently does not take the "true" part very seriously (Upton, 174).

Upton offers some additional and very strong evidence against Engberg-Pedersen's position. Upton points out first that Aristotle does not admit either in *APo.* A.31 or *EN* VI.11 that the immediate results of *epagôgê* and *nous* can be or are admitted to be false (Upton, 174). Indeed, according to *Posterior Analytics*, *epagôgê* provides the foundations of demonstration, somehow yielding its starting points (*archai*), which, presumably, would include (or would be) ultimate premises. And the premises of a demonstration are "better known than" the demonstrated knowledge (*APo.* A.2, 71b17-33). Further, given that *Posterior Analytics* clearly implies demonstrated knowledge is certain, it is impossible to

²⁴ Engberg-Pedersen refers to *APo.* A.31 where Aristotle claims that one cannot come to know (*epistasthai*) something through sense perception alone, because we perceive particulars and not universals. This may be taken to imply that we also need intellect (*nous*) to know (*epistasthai*) something, because *nous* enables us to generalize and thereby become aware of the universal. But this chapter does not seem to imply that *nous* is *only* a generalizing faculty. Indeed, as I continue above, Upton points out that Engberg-Pedersen's own account of the examples in *APo.* A.31 of coming to know the general causes of burning glass and of eclipses suggests that for Aristotle *nous* not only makes generalizations but does so veridically. For further evidence that *nous* for Aristotle is a generalizing faculty Engberg-Pedersen refers to *EN* VI.11, 1143a35-b5 (Engberg-Pedersen, 310), where Aristotle seems to say that *nous* is responsible to reaching the ultimates of demonstration. To reach such "ultimates," Engberg-Pedersen says, *nous* must be able to generalize. (Engberg-Pedersen, 310-11) Upton, again, points out that Aristotle does not here say that *nous* is *only* a generalizing faculty (Upton, 174).

escape the position that the ultimate premises of demonstration, obtained by *epagôgê* and *nous*, must also be certainly true.²⁵

I think Upton puts this point, and the criticism of Engberg-Pedersen's position that it implies, well:

By his account, E-P [Engberg-Pedersen] implies that more than *epagoge* and *nous* must come into play in order to achieve such true and necessary premises which are the *archai epistemes*, or that these *archai* cannot be achieved at all. Since he (Aristotle) explicitly takes up the question of those states of knowing that are concerned with true, universal and necessary propositions (cf. *APo.* I 33, 88b30ff), and since he concludes that knowledge, generated by demonstration or achieved by *nous*—the *arche episteme* (88b36) and the state of mind that results from *epagoge*—is of true and necessary universal premises, Aristotle himself strongly suggests that *epagoge* and *nous* are sufficient for achieving *archai* and that indeed *archai* are achievable. (Upton, 174)

Further, Upton remarks that the immediate results of *epagôgê* and *nous*, given Engberg-Pedersen's description of these, would be what Aristotle calls

²⁵ See *APo.* B.19. Aristotle begins this chapter by stating that what follows will make plain how we discover the *archai* of demonstration (99b16-9). Later, after a discussion of how we come to know primitives [*protai*], he offers a summary and says, "Thus it is plain that we must get to know the primitives by induction [*epagôgêi*]; for this is the way in which perception instills the universal" (100b3-5, trans. Barnes modified). So, apparently, the "primitives" either are or are among or are parts of the *archai* of demonstration. Later, in regard to the states "by which we grasp truth," the chapter says, "Of the intellectual states by which we grasp truth, some are always true and some admit of falsehood (e.g. opinion and calculation do—whereas understanding [which is of demonstrated conclusions] and comprehension [*nous*], which is of the *archai*, starting points, of demonstration] are always true); and no kind apart from comprehension [*nous*] is more exact than understanding" (*APo.*, 100b6-9). The implication is that at least some products of *epagôgê* and *nous*, namely *archai* of demonstration, must be certainly true. This implication is strengthened by Ch. A.4, which states that "A demonstration ... is a deduction which proceeds from necessities" (73a24-5), and then proceeds to offer criteria for determining whether a proposition is necessary. Knowledge of the necessary, whether *nous* or *episteme*, would, it seems, be certain, and not just probabilistic, knowledge, since, if one believes a claim is only probably true, one believes it could be false, i.e. one does not see it is necessary.

“opinion” (“*doxa*”), (Upton, 174).²⁶ And it is clear that for Aristotle, mere *opinions* cannot be the ultimate premises of demonstrations.²⁷

Upton further remarks that in the face of evidence in the *Posterior Analytics* and the *Nicomachean Ethics* that conflicts with Engberg-Pedersen’s view, one would expect Engberg-Pedersen to cite texts that both deal with the apprehension of *archai* and present counter-arguments to the position of the *Posterior Analytics* and the *Nicomachean Ethics* that support Engberg-Pedersen’s view. This is a reasonable expectation. But, as Upton remarks, Engberg-Pedersen cites no such texts, evidently because he cannot. For there *are* no such texts.

I thus agree with Upton that we must reject Engberg-Pedersen’s view that for Aristotle the immediate results of *epagôgê* and *nous* may be either true or false. Rejecting that, we must reject the implication that all *epagôgê* for Aristotle is non-inferential. If *epagôgê* and *nous* yield true generalizations when the *epagôgê* is an imperfect induction, then there must be an inference from the particular facts to the universal conclusion.²⁸

²⁶ See *APo.* A.33, 88b30-89a4, especially: “Now it is comprehension [*nous*] and understanding [*episteme*] and opinion [*doxa*] (and what is called after them) which are true. Hence it remains that opinion is concerned with what is true or false but can also be otherwise” (*APo.*, 89a1-4).

²⁷ See *APo.*, 100b5-8, where Aristotle *contrasts* opinion (*doxa*) the state of knowing the principles (*nous*).

²⁸ This leaves unanswered the question of whether Aristotle thought that *nous* somehow justifies the inference in an *epagôgê*, and thereby provides the solution to the problem of induction. I will deal with this question in the next section.

IV. *Nous* is Not Intuition

My concern in denying that *nous* for Aristotle is intuition is not to argue that “intuition” is in no sense whatsoever a proper translation of “*nous*.” It is rather to deny the cognitive function that many commentators have taken *nous* to have: to directly grasp the universal in particulars and thereby be a justification for the inductive leap. The translation of “*nous*” as “intuition” typically reflects the view that the grasp of principles is a non-discursive intuitive grasp that is not troubled by (or involves the intuition as the solution to) the problem of induction.

Commentators who take *nous* as intuition that solves or avoids the problem of induction generally base their position on one or both of two general considerations. These are as follows. (1) Aristotle is aware of the epistemic frailty of induction (*epagôgê*) in reaching general truths. This suggests that he did not think that *epagôgê* alone could secure the truth of propositional principles of demonstration. Given this, it seems reasonable that he would take *nous*, alone or in connection with epagogic discovery, as the means of ascertaining the truth of propositional principles. (2) The genetic account of *APo.* B.19 describes a process, of coming to know principles of demonstration, that is non-discursive. Hence, *epagôgê as a process of reasoning or argument* is not the means of coming to know principles. This creates the suggestion that a non-discursive act of *nous* is involved in grasping the principles.

I have already argued, in Ch. 3, against two commentators who take *nous* as the means of coming to know the principles: Evans and Harari. As I indicated in Ch. 2, part of the reason that Evans subscribes to this view is the first of the two considerations. Harari, however, clearly based hers on the second consideration.²⁹

Recall that my criticisms of Evans and Harari consisted in part in resolving the contradictory triad that (a) *epagôgê* is the means of coming to know principles, that (b) *epagôgê* is a *logos*, and that (c) *nous*, not *logos*, is the means of knowing principles. I have argued that it is more plausible to deny (c), if “*logos*” is taken to mean “reasoning,” than (a) or (b). Resolving this contradictory triad constitutes a major part of my criticism against commentators who take *nous* as intuition that “just sees” the universal. For if we ascribe to Aristotle (c), where “*logos*” is taken to mean “reasoning,” then there *is* a strong suggestion that he thinks *nous* as a non-discursive faculty (such as intuition) somehow allows one to “just see” the universal concepts and/or general ultimate premises of demonstration, so that there is no unsolved problem of induction.

For what follows, I will consider and criticize other views that for Aristotle *nous* is intuition that solves or allows one to avoid the problem of induction. I will consider views based on the first of the two considerations first.

²⁹ Again, according to Harari, what she calls “inductive perception” is non-discursive, performed by *nous*, and the means of coming to know principles of demonstration.

Bayer holds that Aristotle is aware of the problem of induction, that for Aristotle, *epagôgê* by itself is “too frail” to obtain principles which are “truer” and “more exact” and “better known than” the demonstrated objects of *epistêmê* (Bayer, 126-8).

Ross holds a similar view (Ross, 37, 47-51). In Ross’ view, good Aristotelian epagogic reasoning that is not perfect induction (which is what Ross thinks is discussed in *APr.* B.23) yields a conclusion that is probably, but not certainly, true (Ross, 48). Hence, induction (*epagôgê*) cannot serve as a proof or demonstration of a principle of demonstration. In coming to know principles, a process of *epagôgê* in which one perceives particular facts *suggests* a general propositional principle that subsumes those facts. But it is only through an act of intuition or insight—*nous*—that we can be certain of the truth of the principle (Ross, 49).

Finally, Victor Kal holds a similar view.³⁰ According to Kal, any epagogic argument that is not perfect induction is, for Aristotle, not conclusive (Kal, 27-31, 110). Kal thinks that for Aristotle, it is sense perception, experience, and intuition (*nous*), not *epagôgê*, that secures the truth of a principle of demonstration (Kal, 44-53, 110-1).³¹

³⁰ Victor Kal, *On Intuition and Discursive Reasoning in Aristotle* (Leiden, Netherlands: E.J. Brill, 1988). (Unless otherwise noted, any further reference to a work by Kal will be to this work.)

³¹ Kal’s basis for this view, in addition to his claim that for Aristotle all induction that is imperfect is inconclusive, is his view that Aristotle thinks that all *epagôgê* is dialectical (Kal, 27-31, 54-60,

But with my reading of the genetic account, and the putative solution, based on the doctrine of natural kinds, to the problem of induction, it is not reasonable that Aristotle thought the *epagôgê* described in the genetic account was too frail. Again, on my reading, the genetic account describes a process of grasping universal forms on the basis of sense perceptions of particulars. A universal form is grasped when an experience (*empeiria*) is *differentiated* in one's mind from other forms. As Aristotle thinks that the form of a thing determines what it is (i.e., that the definition of thing reflects its form), grasping a universal form allows one grasp with certainty the truth of a definitional propositional principle connected with that universal form. In grasping the universal form of man, for example, one presumably recognizes that reasoning is a part of that form which differentiates it from other forms in one's mind (such as those of non-human animals). Hence upon grasping the form, one knows the truth of the principle that all (or most) humans reason with certainty.³² On this reading, one does not have good grounds to take Aristotle to think that *epagôgê* is too frail to secure the truth of propositional principles of demonstration. Thus, on this reading, one cannot justifiably cite Aristotle allegedly taking *epagôgê* to be

110) and that the process of coming to know principles described in the genetic account is not dialectical or discursive (Kal, 44-52, 110-1). Kal thinks, much like Hamlyn, that the *epagôgê* mentioned in *APo.* B.19 is a dialectical argument employed by a teacher to produce an initial *tentative* acceptance of a principle by the student (Kal, 51-3, 111), but to be fully certain of the truth of the principle, the student must rely on his own sense perception and intuition (*nous*), (Kal, 44-52, 111).

³² I will discuss Aristotle's attempted solution to the problem of induction, as it pertains to the genetic account, in greater detail in Ch. 7.

epistemically frail as evidence that the genetic account introduces *nous* as intuition which allows one to grasp general truths without induction or which supplements induction by certifying the truth of the conclusion reached by induction.

We can now turn to the second main consideration for taking *nous* in the genetic account as intuition that solves or allows one to avoid the problem of induction. This is the claim that the genetic account of *APo.* B.19 describes a process of coming to know principles that is non-discursive. This is part of the reason that Irwin and Kal take *nous* in the genetic account as intuition (Irwin, 135-6; Kal, 46, 110). The evidence cited by both Irwin (in Irwin, 125-33) and Kal (in Kal, 46-7, 110-111) that principles of demonstration for Aristotle are not discursively justified is as follows. *APo.* A.1 claims that “[a]ll teaching and all learning of an intellectual [*dianoêtikê*] kind proceed from pre-existent knowledge [*gnôseôs*]” (*APo.*, 71a1-2). This appears to introduce the concept of a *chain* of demonstrations. In *APo.* A.3, Aristotle seems to consider the idea of a chain of demonstrations, asking whether such a chain needs to terminate at some foundation, or if it can regress infinitely and still constitute demonstration, or if it can be circular and still constitute demonstration. Aristotle rejects the second and third alternatives and accepts the first (*APo.*, 72b5-73a20). He claims that there is

some knowledge³³ which is not demonstrated, but is the ultimate basis of demonstrations (*APo.*, 72b19-25). The suggestion is that such undemonstrated knowledge is foundational and hence acquired through *non-discursive* means.³⁴ The genetic account of *APo.* B.19 is evidently about how we acquire this undemonstrated knowledge which is the basis of demonstration. Hence, there is the suggestion that the genetic account about how we come to acquire this knowledge is intended to describe a *non-discursive* process.

However, the suggestion that the undemonstrated knowledge mentioned in *APo.* A.3 (and discussed in *APo.* B.19) is acquired through non-discursive means as a result of its being foundational is evidently incorrect. For *APo.* A.3 considers and rejects the possibility of a circular chain of *demonstration* and of an infinite chain of *demonstration*. Demonstration (*apodeixis*) for Aristotle is a kind of *sullogismos* (*APo.*, 71b16-34), and, again, as I argue in Ch. 1 and 3, *sullogismos* is *one* of the two main species of *logos*, the other being *epagôgê*. Hence, one cannot legitimately infer that the undemonstrated knowledge mentioned in *APo.* A.3 (and discussed in B.19) is non-discursive (i.e., reached and justified by non-discursive means). One can only infer that such knowledge is *undemonstrated*, and the

³³ Here, at *APo.*, 72b19-25 (Ch. A.3), where Aristotle makes this claim, he refers to such undemonstrated knowledge with the same term he uses to refer to demonstrated knowledge: *epistêmê*. However, in *APo.* B.19 at 100b5-17, he seems to modify his position, saying that this undemonstrated knowledge is *nous* and not *epistêmê*, reserving the term “*epistêmê*” only for demonstrated knowledge.

³⁴ The general sense of the term “discursive” as used by commentators appears to be “proceeding from prior knowledge or cognitive items.” This is the sense I am using in this work.

foundation all *demonstrated* knowledge. As I indicate in my reading of the genetic account (and especially in my response to Hamlyn in Ch.2), the account indicates that the knowledge (the concepts and certain definitional propositions) at the foundation of demonstrated knowledge is acquired through a certain kind of reasoning (i.e. is discursively acquired and justified in a certain way): *epagôgê* based on sense perception.

Further, it is not accurate to say that *APo.* A.1, which begins with the statement that “[a]ll teaching and all learning of an intellectual [*dianoêtikê*] kind proceed from pre-existent knowledge [*gnôseôs*]” (*APo.*, 71a1-2) is discussing only a chain of *demonstrations*. For very shortly after, the chapter mentions both deductive and epagogic reasoning both proceeding from prior knowledge (i.e., both being discursive):

[Z]

Similarly with arguments [*tous logous*] both deductive [*hoi dia sullogismôn*] and inductive [*hoi di’ epagôgês*]: they affect their teaching through what we already know, the former assuming items which we are presumed to grasp, the latter proving something universal by way of the fact that the particular cases are plain. (*APo.*, 71a5-9)

Hence, the correct relationship between this part of *APo.* A.1 and A.3 is evidently *not* that A.1 introduces the concept of a chain of demonstrations and A.3 asks whether such a chain must terminate or whether it can be circular or regress infinitely. The correct relationship is rather that A.1 introduces the concept of a chain of *reasoning* (epagogic *and/or* deductive) and A.3 asks whether a chain of

demonstrative reasoning in particular must terminate or not. A.3 answers that it must, states some knowledge is *undemonstrated*, not that some knowledge is *non-discursive*. Then, the genetic account of *APo* B.19, given my reading, describes how this undemonstrated knowledge is acquired and justified: through a *discursive* process of *epagôgê* based on sense perception.³⁵

For part of their evidence that the genetic account of *APo*. B.19 intends to describe a non-discursive process, both Irwin (Irwin, 135-6) and Kal (Kal, 46-7, 131) refer, in addition, to a part of that chapter which may be taken to imply that claim, namely Passage I, which I discuss in Ch. 3:

[I]

...the principles [*archai*] of demonstration are more familiar, and all understanding [*epistêmê*] involves an account [*esti meta logou*]. Hence, there will not be understanding of the principles; and since nothing apart from comprehension [*noun*] can be truer than understanding, there will be comprehension of the principles. (*APo.*, 100b9-12)

The part of Passage I translated “all understanding (*epistêmê*) involves an account” may alternatively be translated that “all understanding (*epistêmê*) is with reasoning.” The latter translation implies that the principles of demonstration are without reasoning, i.e. are not discursively discovered or justified. However, in

³⁵ Quoting Bolton’s fn. 4 is useful: “J. Barnes (*Aristotle’s Posterior Analytics* (Oxford 1975), 251) criticizes Aristotle for invoking [in *APo*. II. 19] his earlier doctrine from I. 1 about ‘intellectual’ or inferential learning. His reason is that Aristotle does not believe that learning of the principles is intellectual, that is ‘knowledge of principles is not deduced knowledge’. But Aristotle’s invocation of the earlier doctrine shows that he does believe that learning of principles is inferential. The inferential process may not be deductive but, according to I. 1, not all intellectual learning is deductive. It may also be inductive (71a5-9), which is what Aristotle has in mind here (100b2-4)” (Bolton, 5). Bolton’s reference to 100b2-4 is to the end of the genetic account of *APo*. B.19.

Ch. 3 on Evans and Harari, I have argued that the latter translation is not a good one. My argument was in connection with a contradictory triad that seems to appear in the works of Aristotle:

(d) *Epagôgê* is the means of coming to know principles (as indicated by *APo.* B.19).

(e) *Epagôgê* is a kind of *logos* (as indicated by various texts).

(f) *Nous*, not *logos*, is the means of coming to know principles (as indicated by the passage from *EN*, 1143a35-b4).

Again, I had argued that the evidence that Aristotle holds (a) and (b) is very strong, but that we can reasonably deny that he holds (c) if “*logos*” in (c) is taken to mean reasoning. As discussed in Ch. 3, if, in the *Nicomachean Ethics* passage on which (c) is based (and in Passage I), we translate inflections of “*logos*” as “account” or “explanatory account” rather than “reasoning,” this is consistent with his view of the nature of the “immediate” (*amesa*) principles of demonstration. On that basis we can deny that he holds (c) if “*logos*” in (c) is taken to mean “reasoning,” and thereby resolve the contradictory triad.

In addition to the claim that the genetic account of *APo.* B.19 is supposed to describe a non-discursive process of coming to know the principles, Irwin and Kal each cite an additional reason for taking *nous* in that chapter as intuition that allows one to grasp universal concepts and general truths.

Part of Irwin's reason for taking *nous* in the genetic account as intuition is that induction alone would not explain how the principles of demonstrations could be *better known in nature* (Irwin, 135-6).³⁶ My response is that, with my reading of the genetic account, a principle like "all (or most) humans reason" will be grounded in the subject form, in this case, that of man, and as such, will have the underpinning for it being better known in nature. For the processes of *differentiating* form from other forms will allow one to grasp what is *distinctive* and pertains to that form, i.e. what is definitional in connection with that form. (Again, for man, presumably rationality is the differentia.) It may require the divisional methods in *APo.* B prior to Ch. 19 to determine that it *is* definitional (i.e., involving a *katholou* predication as per *APo.* A.4), a principle, and hence better known in nature. We do not need to appeal to *nous* as "intuition" to explain how Aristotle could think we would know that a principle *is* a principle and better known in nature than what is to be demonstrated.

Part of Kal's reason for taking *nous* in the genetic account as intuition is that he thinks *epagôgê* for Aristotle is only a dialectical argument (and one that is too frail to secure principles), and as such has a certain function in our coming to

³⁶ Again, *APo.* A.2 at *APo.*, 71b34-72a6 distinguishes between what is more familiar (or better known) *to us* and what is more familiar (or better known) *in nature*. The suggestion is as follows. What is particular and directly perceivable with our senses, or at least more easily perceivable with our senses, is better known *to us*. However, what is universal (i.e., *katholou*, and thereby logically more basic in demonstrations) is better known *in nature*. Further, Ch. A.4 requires that a *katholou* predication be essential (i.e., definitional) thereby seeming to further specify what it is for something to be better known in nature.

know principles, but cannot explain how we first become acquire the material behind (i.e., the sense *empeiriai*) and secure a principle. So, Kal thinks, this must be explained by sense perception and *nous* as intuition (Kal, 27-31, 44-53). However, as I indicated earlier (in Ch. 3) when arguing that for Aristotle *logos* is the genus of *epagôgê*, it is not plausible that Aristotle thinks that *epagôgê* is *only* a dialectical argument. And, in Ch. 4, I indicate how Aristotle could plausibly think that non-dialectical *epagôgê*, based on sense perception, consists in moving from sense perception to memory and experience to the universal (and correlative propositional principles connected with the universal).

While there are passages in the *Nicomachean Ethics* that suggest that *nous* is a faculty, this is not enough for us to think that it is non-discursive intuition that grasps the principles. And, those passages do not imply that *nous* being a faculty is opposed to its being a state. To reiterate my claim from Ch. 3, if we integrate those passages with *APo.* B.19, *nous* in *APo.* B.19 is the state (but not the process) *by* which we know principles. It is a state which is innate in the sense of being a certain innate faculty (*dunamis*, potentiality), namely sense perception. As this potentiality is *actualized*, *nous* comes to consist in *actual* cognitive content (percepts, experiences, and universal principles) and as such becomes a faculty that is more advanced (i.e. consists of more than just the faculty of sense perception). But *nous* is not the *process* by which we know principles. The process, the answer to the *first* of the two questions at the beginning of *APo.* B.19,

is *epagôgê* based on sense perception. This is a picture that resolves any conflict between the claim of *APo.* B.19 that *nous* is the state of knowing the principles (which evidently, again, is the answer to the *second* of the two questions) and the passages in the *Nicomachean Ethics* which imply that *nous* is a faculty.

V. Conclusion

I have argued in previous chapters against the claim that the genetic account of *APo.* B.19 claims that the sense perception of a single particular is enough to grasp the universal it instantiates. We can now also reasonably claim that, according to the genetic account, the object of an experience (*empeiria*) is not one but many particulars. Connected with this, my view that according to the genetic account, an undifferentiated experience becoming differentiated is what allows us to grasp a universal and connected definitional truths, appears to be correct. Further, I take the process described by the genetic account to be a process of *epagôgê* based on sense perception. It seems that I have successfully defended the claim that the role of the *epagôgê* is to justify the propositional principles, not just to reach them. Finally, it seems that I have also cleared away the claim that Aristotle considers in the genetic account *nous* to be intuition that grasps principles without induction or as a supplement to induction that secures the induction. With all of this established, I have nearly shown that Aristotle in

the genetic account of *APo*. B.19 is aware of the problem of induction and holds a putative solution to it (that is not simply “intuition”).

Chapter 6: Other Conceptions of Aristotelian Induction

I. Introduction

I have so far presented (in Ch. 4) my reading of the genetic account of *APo.* B.19 and have defended (in Ch. 2, 3, and 5) my reading of the genetic account from other readings of that account.

But before I discuss in detail the implications of my reading of the genetic account with regard to whether Aristotle is aware of the problem of induction in that account and whether he has an attempted solution to that problem, there are two other conceptions of Aristotelian induction I need to consider. These are conceptions of Aristotelian induction which conflict with my reading of the genetic account of *APo.* B.19 but which are not themselves based on readings of the genetic account. My intent in this chapter is to consider and criticize these conceptions of Aristotelian induction. The conceptions I will consider and criticize William Whewell's (in Section II) and John P. McCaskey's (in Section III).¹

¹ William Whewell, "Criticism of Aristotle's Account of Induction" in William Whewell, *Theory of Scientific Method*, ed. Robert E. Butts (Indianapolis, IN: Hackett Publishing Co., 1989), 311-21. (Any further reference to a work by Whewell will be to this work.) John P. McCaskey, "Freeing Aristotelian *Epagoge* From *Prior Analytics* II 23," *Apeiron*, v. 40, No. 4 (December, 2007), 345-74. (Any further reference to a work by McCaskey will be to this work.)

II. William Whewell's Conception

Whewell in his essay "Criticism of Aristotle's Account of Induction" provides a reading of *APr.* B.23. As part of that, he thinks that Aristotle did not regard induction as a sort of reasoning. Part of Whewell's basis for that position is an analysis of the "*sullogismos ex epagôgês*" in *APr.* B.23. Recognizing that Aristotle bases his claim therein on individual long-lived species (i.e. on C's), Whewell claims Aristotle must have known that at any point in zoological discovery, we cannot know how many long-lived species there are (Whewell, 316). Aristotle would know, Whewell thinks, that we cannot know whether we know of *all* the long-lived species. Thus, according to Whewell, if Aristotle thinks that we can be convinced through induction that all C's are B (i.e. that all particular long-lived species are bile-less), it cannot be either that Aristotle regarded the induction as a *perfect* one, nor that Aristotle regarded the induction as imperfect but rationally justified. Aristotle must have regarded the induction as imperfect, Whewell thinks. But if we ask how he would rationally justify such an induction, we have a mistaken assumption behind our question. Since Aristotle must have been aware that we cannot know whether we know of all long-lived species, for example, he must have been aware that induction is *unjustified as reasoning*. According to Whewell, an inductive truth for Aristotle is an *observed* truth not a *reasoned* truth. We come to know an inductive truth through sensory observation, not through reasoning. According to Whewell, such observed truths

for Aristotle that are known, but not demonstrated, are more “luminous” than demonstrated truths, and are the basis of reasoned, demonstrated truths (Whewell, 316-7).

As corroborating evidence for his position, Whewell points to the fact that according to Aristotle’s definition of *sullogismos*, the conclusion in a *sullogismos* follows *of necessity* from the premises, but Aristotle makes no such claim of necessity for *epagôgê*, and often presents *sullogismos* and *epagôgê* as mutually opposed. (That is, Whewell points to the fact that Aristotle held what I have called the Necessity Thesis.) Such necessity in *sullogismos* would make its inference justified as reasoning. But, Whewell continues, Aristotle recognized there is no such necessity in *epagôgê* and so he could not have believed that any *epagôgê* (including the *epagôgê* presented in *APr.* B.23) is a perfect induction. For in a perfect induction, there would be such necessity (Whewell, 316). *Epagôgê* as imperfect induction does stand in contrast to *sylogismos* precisely because there is no such necessity in *epagôgê* so conceived, and thus, no logical justification in it (Whewell, 316).²

Whewell translates a crucial part of *APr.* B.23 (within the part quoted in Ch. 1, Section VIII, from 68b25-9) so that it is consistent with his position that

² Clearly, Whewell does think that Aristotle believed that the “*sullogismos ex epagôgês*” in *APr.* B.23 is reasoning and has an inference that is logically justified. But that is because it, as its name indicates, is really a *sullogismos* from an *epagôgê*, namely the *epagôgê* that all long-lived species are bile-less (Whewell, 316-7).

inductive truths for Aristotle are observed rather than reasoned truths. The passage in Greek is: “*he gar epagôgê dia pantôn*” (*APr.*, 68b28-9). Smith’s translation of this, reflecting the common reading of *APr.* B.23 as being about perfect induction, is: “for induction is through them all” (*APr.*, 68b28-9).

Whewell, on the other hand, translates it as: “for Induction is applied to all the cases” (*APr.*, 68b28-9, trans. Whewell in Whewell, 312).

In response to Whewell, let me first point out a remark at the end of *APr.* B.24 that seems difficult to render in a way that is consistent with his position that inductive truths for Aristotle are observed truths and not reasoned truths. The remark, part of a contrast between *epagôgê* and *paradeigma*, is: “...*he [epagôgê] ...ex hapantôn tôn atomôn to akron edeiknuen huparchein tōi mesōi...*” (*APr.*, 69a17-8) Smith renders this, plausibly, as: “...induction proves the extreme to belong to the middle term from all the individuals...” (*APr.*, 69a17-8). (Whewell does not address *APr.* B.24 in his article.) For Whewell to make this passage consistent with the view that *epagôgê* is not reasoning, he would have to render “*ex hapantôn tôn atomôn*” in a way that is substantially different than “from all the individuals,” and it does not seem like this could be done while remaining true to the Greek. In particular, it does not seem like Whewell can legitimately render it as “is applied to all the cases” (as he renders “*dia pantôn*” at *APr.*, 68b28-9). “[E]*x hapantôn tôn atomôn*,” which, again, is plausibly rendered as “from all the individuals” (emphasis added), strongly suggests *reasoning*.

Another consideration against Whewell's reading is as follows. Whewell claims that Aristotle would have recognized *epagôgê* to be unjustified as reasoning, and would thereby consider an epagogic truth to be an *observed*, rather than reasoned, truth. This claim seems to presuppose and rest on Aristotle's recognizing the problem of induction and believing that it cannot be solved. Given Whewell's claim, Aristotle would thus not *need* to solve the problem of induction; epagogic truths, after all, would be observed rather than reasoned truths. But what Whewell evidently does not recognize is that this would create another problem for Aristotle. The claim in *APr.* B.23 that all long-lived things are bile-less would not be a reasoned truth. In particular, according to Whewell, it would not be reached by perfect induction, for according to Whewell, Aristotle does not think he can know whether he knows of *all* long-lived species. And, according to Whewell, imperfect induction for Aristotle would not be rationally justifiable. So, Whewell thinks, it would be an "observed truth" for Aristotle. But how could Aristotle justifiably regard it as an *observed* truth if, as Whewell thinks, Aristotle did not believe he could know whether he has *observed all* long-lived species? Similarly, let us return to one of Aristotle's examples from the *Rhetoric*, discussed in Ch.1, of an inductive claim: that women everywhere can correctly settle facts about their children (*Rhet.*, 1398a32-b4). If the truth of this claim can be inductively established, and it would thereby be an *observed* truth and not a *reasoned* one, we should ask whether Aristotle would think that one

could have *observed* all women everywhere (and *know* that one has). It is implausible that he would. This indicates the problem with regarding all epagogic truths as observed truths. If Aristotle would have recognized the problem of induction, as Whewell's reading seems to presuppose, then, it seems, he would have recognized this problem with regarding all epagogic truths as observed truths. Thus, the reason that Whewell thinks that Aristotle would regard epagogic truths as observed, rather than reasoned, truths, is one that Aristotle could hardly have held and been motivated by. For, it seems, he would have recognized that regarding epagogic truths as observed truths only leads to *another* problem, one for which there does not seem to be a solution.

There is further evidence that Aristotle would have recognized this problem with regarding epagogic truths as observed truths and not reasoned truths. This is the fact, discussed in Ch. 1 and 3, that Aristotle evidently regarded the genus of both *sullogismos* and *epagôgê* to be *logos* in the sense of "reasoning" or "argument." Recall the quote from *APr.*, 24b18-20 in Ch. 1 that contains Aristotle's definition of *sullogismos*. According to that definition, the genus of *sullogismos* is evidently *logos*. Similarly, consider the passage quoted in that section from *APo.*, 71a5-9. The clause just before it is: "Similarly with arguments [*tous logous*] both deductive [*hoi dia sullogismon*] and inductive [*hoi di' epagôgês*]:..." (*APo.*, 71a5-6, emphasis added) This clause strongly suggests that

Aristotle regarded *sullogismos* and *epagôgê* as the two main sorts of *logos*.³ The passage quoted in Ch.2 from *Top.* I, 105a10-4 similarly suggests that Aristotle regarded *sullogismos* and *epagôgê* as the two exhaustive sorts of dialectical *logos*. Finally, the passage quoted in Ch. 1, Section V, from *Rhet.*, 1356a37-b5, suggests that Aristotle regarded *sullogismos* (as *enthumema*) and *epagôgê* (as *paradeigma*) as the two sorts of rhetorical *logos*.⁴

III. John McCaskey's Conception

I will turn now to McCaskey's position, argued for in "Freeing Aristotelian Induction From *Prior Analytics* II.23," that for Aristotle, all induction that is not a kind of deduction is explanatory and not justificatory. Such a position conflicts with my position that Aristotle dealt with the problem of induction. For if a given induction that is not a kind of deduction is only an *explanatory* process, then it faces no such problem of induction.

³ That is, Aristotle seems to divide *logos* into other classes as well, such as demonstrative, dialectical, and rhetorical. But none of these classes seem to extend beyond *sullogismos* and *epagôgê*, (e.g., he does not seem to recognize any dialectical argument that is neither epagogic nor deductive). With regard to the issue of whether one is reasoning to or from the more universal, *epagôgê* and *sullogismos* are the two main sorts of *logos*.

⁴ Further, it is reasonable that in Aristotle's descriptions and definitions of *epagôgê* and *sullogismos*, "*logos*" is translated as "reasoning" or "argument" for such a translation would make sense of the strong evidence that for Aristotle *epagôgê* and *sullogismos* are the two species of *logos*. Further, given that the root sense in Greek of "*logos*" seems to be "word" or "speech," it is implausible to translate it as "sense perception," "observation" or with a term (such as "awareness") denoting a kind of which sense perception would arguably be a species for Aristotle. But such a translation of "*logos*" would be required if we are to make the textual evidence that for Aristotle *epagôgê* is a species of *logos* consistent with Whewell claim that Aristotle regarded epagogic truths as perceived, not reasoned truths.

McCaskey's position, like that of Whewell relies on a reading of *APr.* B.23 according to which Aristotle is *not* taking *epagôgê* to be perfect induction.⁵ McCaskey thinks that a careful and proper analysis of *APr.* B.23 will indicate that for Aristotle, "induction" has a primary and secondary sense (McCaskey, 361). The proper translation, McCaskey thinks, of "*Epagôgê...kai ho ex epagôgês sullogismos...*" (*APr.* B.23, 68b15-6) is "Induction, then—that is, a deduction from induction..." (McCaskey, 357). Further, if that phrase is coherent, McCaskey thinks, "induction" cannot have only one sense, since, if "induction" is equated with "deduction from induction" (as that passage appears to do), having only one sense creates an infinite regress in regard to what induction is (McCaskey, 356, 361-3).⁶ Aristotle has a primary sense of "induction" in mind, McCaskey thinks, on the basis of which he uses a secondary sense and gives an example of it (in *APr.* B.23), which is deduction from *induction in the primary sense* (McCaskey, 362-3).

For Aristotle, McCaskey thinks, induction in the primary sense consists of seeking a certain sort of universal term (and often more than one) to predicate of

⁵ Throughout his paper, McCaskey uses "*epagôgê*" and "induction" interchangeably, but mostly uses "induction." Thus, in presenting his position, I will mostly use "induction," as he does, for *epagôgê*.

⁶ That is, if induction *is* deduction from induction, then, by substitution, deduction from induction would be deduction from deduction from induction, and, by substitution, that would be deduction from deduction from deduction from induction, etc. The result would be that what induction *is* would have to be expressed by an infinitely long phrase. McCaskey thinks that this problem can be avoided if, in the phrase quoted above, the second instance of "induction" is read as having one sense, and the first is read as having another sense based on the sense of second.

certain particular individuals or kinds. What sort of universal term is this?

McCaskey thinks that certain examples of induction that Aristotle gives,⁷ and the theoretical material in *Top.* V,⁸ indicate that the universal must be a distinctive property—an *idion kath' auto*—of the particulars.⁹ Thus, according to McCaskey, the conclusion of an induction in the primary sense predicates an *idia kath' auto* of certain particulars. For example: we are aware of individual long-lived things (i.e. C's, in the terms of *APr.* B.23), such as man, horse, and mule.¹⁰ And: man, horse, mule, etc. are bile-less (B). McCaskey thinks that this is an induction in the primary sense that tacitly takes place in *APr.* B.23 before Aristotle offers his *sullogismos ex epagôgês*, his deduction from induction in the primary sense,

⁷ McCaskey, for example, cites the example of *epagôgê* in *EE* II at 1219a1 that concludes that things that have a work or use have a goodness, and that having a goodness is *distinctive* to things that have a use or work (McCaskey, 369). Another example that McCaskey cites is the claim at *Phys.*, 244a26ff that for things subject to alteration, the property with respect to which the alteration takes place is also the property which causes the alteration (McCaskey, 369). Presumably, the property of having a property which causes alteration and which is the same as the property with respect to which the alteration takes place is a distinctive property of things subject to alteration.

⁸ As McCaskey indicates, *Top.* V is specifically about how to find an *idion kath' auto*—a distinctive property—of given individuals (McCaskey, 359). McCaskey admits that “*epagôgê*” does not appear anywhere in *Top.* V, but thinks that, nevertheless, induction in the primary sense (which consists of reaching *idia kath' auto*) is the implicit subject of the chapter (McCaskey, 371).

⁹ McCaskey's position is that for Aristotle, definition is one way to convey the meaning of a universal term. Even though some *idia kath' auto* are not definitional properties, they nonetheless can help convey the meaning of a universal term because they *are* distinguishing of the particulars under the terms to which they apply. (McCaskey, 359)

¹⁰ In my view, the C's (individual long-lived things) mentioned in *APr.* B.23 are more reasonably individual *species* rather than ultimate particulars, for, again, Aristotle mentions man, mule, and horse as individual long-lived things (*APr.*, 68b20-1), and bases an induction (*epagôgê*) about all long-lived things on these “individual long-lived things” (*APr.*, 68b15-30). McCaskey, however, leaves open whether Aristotle intends the individual long-lived things to be individual species or ultimate particulars (McCaskey, 357).

which is induction in the secondary sense (McCaskey, 361). It consists of predicating a distinctive property, bile-less (B) of all individual long-lived things (C's), i.e. man, mule, horse, etc. (Hence, according to the induction, all *and only* individual long-lived things are bile-less.)

McCaskey seeks to justify his position in regard to what induction in the primary sense is for Aristotle by arguing that it was essentially Socrates' view of induction. McCaskey bases this argument, first, on the observation that in the corpus, Aristotle does not provide any detailed analysis of what "*epagôgê*" is, unlike his treatment of other things (McCaskey, 363). Yet, Aristotle says, what kind of thing "*epagôgê*" is clear (McCaskey, 363).¹¹ Thus, McCaskey thinks, Aristotle assumes throughout the corpus that his students already know what *epagôgê* is. So, to discover the conception of induction Aristotle had in mind (for his primary sense of induction), we should ask: what would be the common conception of induction for Athenian students in the fourth century BC? Clearly, McCaskey thinks, it would be the Socratic conception. Indeed, Aristotle explicitly credits Socrates as introducing inductive reasoning without suggesting that the term "induction" ("*epagôgê*") is unfamiliar (McCaskey, 363).¹²

McCaskey thinks that the similarities between Aristotle's and Socrates' uses of induction are undeniable. And to Aristotle's students, Socrates would have

¹¹ McCaskey's reference to Aristotle for that statement is to *Top.* VIII, 157a8.

¹² McCaskey's reference to Aristotle is to *Met.*, 1078b28.

been a figure of the recent past whose conception of induction would have been familiar (McCaskey, 364). So, McCaskey concludes, unless we are presented with evidence to the contrary, we should assume that Socrates' conception of induction is Aristotle's conception of induction (in the primary sense), (McCaskey, 364).¹³

In regard to what Socrates' conception of induction *is*, McCaskey thinks that Gregory Vlastos is correct in thinking that induction for Socrates is an attempt to *elucidate and explain*—through the citation of examples—the meaning of a universal term rather than to prove a universal proposition by citing particular facts (McCaskey, 364). To illustrate his point, McCaskey cites Vlastos' reference to one of Socrates' uses of induction in Plato's *Ion*. In Vlastos' analysis, Socrates seeks to exhibit the meaning of the term “master craftsman.” Socrates does so by citing examples of master craftsmen each having a certain property. For example: “The pilot is the one who knows best what should be said to the crew of a storm-tossed ship. ...The cowherd is the one who knows best what should be done to calm angry cattle” (McCaskey, 364).¹⁴ From such statements, Socrates gives us a conclusion elucidating the meaning of “master craftsman”: “the master of any

¹³ It is helpful to bear in mind, with regard to what follows, that Aristotle typically writes of defining *things* (universal kinds in nature), not words. Hence, when mentioning what Aristotle might take as the *meaning* of something (of some natural kind), McCaskey and I intentionally do not put the word or phrase denoting that kind in quotes.

¹⁴ This is a part of McCaskey's quoting of Vlastos' paraphrasing of Plato's *Ion* at 540b-d. McCaskey's reference to Gregory Vlastos is *Socrates: Ironist and Moral Philosopher* (Ithaca, NY: Cornell University Press, 1991), 267-8. Unless otherwise noted, any reference to a work by Vlastos will be to this work.

craft ‘is the one who knows best matters falling within its subject-matter’”

(McCaskey, 365).¹⁵ In regard to this argument, Vlastos writes:

In this argument, the conclusion is obviously more general than any of the premises. To that extent it is like an inductive argument, but with this vast difference that it is not *probable inference* from what is true of some cases to what is true of all cases. ...we are not leaving logically open the possibility that there might be some craft C_a such that the master of some other craft C_b or a layman who is master of neither might have knowledge of matters falling in the domain of craft C_a which is superior to that of the master of craft C_a . Here the truth of the conclusion is *built into the meaning of its critical term* “master of a craft”: anyone who claims to be a master of a given craft but does not possess relevant knowledge superior to that of a master of some other craft or of no craft at all would be *ipso dicto* disqualified as a fake. ...in Socratic epagogic arguments there is “reference to some instances [of a general statement] which *exhibit the meaning of the statement* by exemplifying it, rather than *prove* it; it is really only what logicians call ‘intuitive induction.’” (Vlastos, 268, all emphases are in the original)¹⁶

According to Vlastos (and McCaskey), a Socratic *epagôgê* seeks to elucidate the definitional meaning of a universal term. It does not seek to prove the conclusion—either fully or probabilistically. Why then would we be justified in accepting the conclusion as true? The conclusion is *true by definition*. The subject of the conclusion is the universal term whose definitional meaning the *epagôgê* seeks to exhibit and make clear. The predicate is the definition, gathered by the epagogic process, of the subject term. As such, the conclusion is *true by*

¹⁵ The quote by McCaskey is from Vlastos, 268.

¹⁶ Vlastos, unlike McCaskey, objects to calling Socratic *epagôgê* “induction,” thinking that the word is a mistranslation. See Vlastos, 267.

definition. As Vlastos indicates, if one were to try to produce a counter-example to the conclusion, it would be rejected *ipso dicto* as a false counter-example (as having a subject that is not a member of the subject term of the conclusion *by definition* of that subject term). There is no problem of induction.

McCaskey thinks Aristotle escapes the problem of induction essentially the same way Socrates does. As induction for Socrates consists of elucidating the meaning of a universal term, McCaskey thinks, so it (in the primary sense) does for Aristotle. For Aristotle, we elucidate the meaning of a universal kind by identifying a distinctive property, an *idion kath'auto* (not necessarily a defining property—a *ti esti*—which is one sort of *idion kath'auto*) of the members of that kind. A conclusion for Aristotle, reached by induction in the primary sense, is true, not necessarily by definition, but by distinctive property (*idion kath'auto*) meaning. Returning to McCaskey's example of a tacit induction in the primary sense in *APr.* B.23, when we induce that all C's (individual long-lived things such as man, mule, and horse) are B (bile-less), we arrive at a distinctive property of C's. All *and only* C's are B's. Such an induction explains the meaning of long-lived things—not the definitional meaning, but a distinctive property meaning. What if in the future we encounter a new long-lived thing, but it turns out *not* to be bile-less? Aristotle would think that this is impossible in McCaskey's view. For in inducing that all and only long-lived things (C) are bile-less (B), we have arrived at what it *means*, not definitionally, but by distinctive property, for a thing

to be long-lived: it means for it to be bile-less. Accordingly, any alleged long-lived thing that is not bile-less would be rejected *ipso dicto* as being a genuine long-lived thing (McCaskey, 363-5). Again, according to McCaskey, Aristotelian induction in the primary sense escapes the problem of induction in essentially the same way Socratic induction in Vlastos' view does.

The relevance of McCaskey's paper to this section of this chapter is his position that induction in the primary sense (i.e., induction that is not a kind of deduction) for Aristotle is not intended to be a full or probabilistic proof and that accordingly, Aristotle faced no problem of induction. Since my view is that Aristotle in the genetic account of *APo.* B.19 faces the problem of induction, this is the main position advanced in McCaskey's paper to which I object. The other position that I object to is the claim that all Aristotelian *epagôgê* seeks to predicate a distinctive property. This conflicts with my reading of the genetic account, since in my reading, the *epagôgê* described can yield a principle in which the predicate is not a distinctive property of members of the subject kind, such as "all horses are mammals" (assuming that Aristotle thinks that mammal is the genus of horse.)

What follows is my response to McCaskey's argument for the first position. I will then respond to the second position.

The main problem in claiming that Aristotelian induction (in the primary sense¹⁷) escapes the problem of induction is that this cannot be the case if induction is the means of discovering a general truth about all or most members of a *natural kind* (whose members are potentially infinite in number). I have argued in Ch. 2 on Hamlyn that for Aristotle, all convictions (as distinguished from unreasoned beliefs) are reached through *epagôgê* or *sullogismos*. A conviction about a natural kind, such as man, may be based on *sullogismos*. For example, the conviction that all zebras are bile-less may be deduced from the premises that all long-lived things are bile-less, and that all zebras are long-lived. But at bottom, such a conviction about a natural kind must be based on epagogically obtained premises. In this example, the premises that all long-lived things are bile-less and

¹⁷ Since, according to McCaskey, Aristotelian induction in the secondary sense is a kind of deduction (it is the *sullogismos ex epagôgês* described in *APr.* B.23), the problem of induction could not apply to the inductions in the secondary sense; for Aristotle, they would be subject to formal syllogistic rules of inference, and as for every other kind of *sullogismos*, the conclusion would follow *of necessity* from the premises. *APo.* B.19 does not make any mention of any *sullogismos ex epagôgê*, only of *epagôgê*, and the process described is one of moving cognitively from the more particular to the more general. It is, as such, epagogic, and not deductive. However, since *APr.* B.23 mentions (at 68b30-7) reaching immediate (*amesa*) premises—premises that could serve as ultimate premises of demonstration—by *sullogismos ex epagôgê*, it may be that Aristotle thinks that some ultimate premises of demonstration are reached this way. But even if this is the case, reaching at least some ultimate premises of demonstration this way has to rely at bottom on plain, non-deductive *epagôgê*, the kind evidently described by the genetic account of *APo.* B.19. For it is clear that some of the natural kinds (such as man) that are subjects of ultimate premises of demonstration are those with a potentially infinite number of specimens, and, as we have seen, Aristotle does not think that the mind can traverse an infinite series. As a result, a deductive *epagôgê* that is a perfect induction would be inapplicable to them. Further, if like McCaskey, we do not take the deduction from induction described in *APr.* B.23 to be (or to be based on) perfect induction, it would have to rely, at bottom, on plain, non-deductive *epagôgê*, what McCaskey calls Aristotelian induction in the primary sense. Hence, I am only concerned here with the problem of induction as it pertains to what McCaskey calls inductions in the primary sense.

that all zebras are long-lived things would be obtained through *epagôgê*. And *epagôgê* as the discovery of any general truth about a natural kind, such as (presumably) long-lived things, whose members are potentially infinite in number is such that (as I indicate in Ch.1) for Aristotle, we clearly cannot survey all (or even most of) the members. Given this, the question of what if there is a long-lived thing (an ultimate particular¹⁸) that we have not encountered that is bile-less remains. In McCaskey's view, when we induce that all long-lived things are bile-less, we are giving the meaning of long-lived things and hence any alleged long-lived thing that is not bile-less would be rejected *ipso dicto* as genuinely a long-lived thing. The problem, however, is that even if we take bile-less as a (distinctive property) meaning of long-lived thing, how can we *establish* that by induction, given that there is a potentially infinite number of long-lived things (at least as far as ultimate particulars that are long-lived things)? At no point in the induction can we legitimately just *decide* that if something not yet encountered is not bile-less, it is not long-lived. For if long-lived thing is a *natural kind*, whether something is a member of it is not a matter of human decision but of that thing's *nature*.

Hence, in the discovery of the general "truth" that all long-lived things are bile-less (whether or not we think that "truth" gives bile-less as the meaning of long-lived thing), we are faced with the problem of induction. This example of the

¹⁸ I make this qualification because Aristotle may think that there are a finite number of long-lived *species* such that the species *can* be completely enumerated.

discovery of a general “truth” about a natural kind indicates, in pattern, why, for Aristotle, the epagogic discovery of any general truth of a natural kind with a potentially infinite number of members would involve the problem of induction.

In cases where an induction is connected with a class of things which is a not natural kind, but one that is a matter of human stipulation or convention, then the problem of induction can be escaped in the way that McCaskey describes. If the class of long-lived things, for example, is not a natural kind, if something’s being a long-lived thing is just a matter of human stipulation or convention, then in our “induction” that that all long-lived things are bile-less, we might at a certain point decide to *call* only bile-less things long-lived things. Hence, we could reject, *ipso dicto*, the possibility of a long-lived thing that is not bile-less. But, it is not plausible that the epagogic process of discovery (of concepts and related definitional truths) described in *APo.* B.19 is not intended to be about natural kinds.¹⁹

¹⁹ It is clear that for Aristotle, the principles which are ultimate premises of demonstration must reflect natural kinds. For it is evidently Aristotle’s view that a syllogistic deduction that is demonstrative must relate three terms in a way that is isomorphic to the way they are connected or disconnected to each other *in nature*. A clear piece of evidence for this is *APo.* A.20-21, where Aristotle argues against the possibility of infinitely many middle terms in a demonstration (and hence an infinitely long demonstration). This can only make sense if middle terms (and as a result, terms in general, since an extreme in one deduction can be a middle in another) each reflect a term (a kind) in nature, and, in nature, there are explanatory terms between some pairs of terms, but not others (which are related *immediately*). But a demonstration relating three terms in a way that is isomorphic to how they are related in nature cannot be accomplished if the terms do not even reflect kinds in nature, i.e. if a term subsumes some particulars which a putatively corresponding natural kind does not and/or if the term does not subsume some particulars which the natural kind does. And since the ultimate premises of a demonstration are parts of the demonstration, we should take Aristotle to believe at least that any legitimate *epagôgê* to reach ultimate premises of demonstrations must be such that the concepts constituting those premises reflect natural kinds.

Further, Aristotle *might* think that *some epagôgai* are as McCaskey describes. These would be *epagôgai* whose purpose is to *remind* a person about or *make explicit* a general truth *already discovered*. If a person has *already discovered* the general “truth” that all long-lived things are bile-less, but has forgotten that he or she has discovered it, then the citing of examples might help remind the person. Since the person has already discovered the “truth” and he or she is only being *reminded* of it, the person could reject the possibility of any long-lived thing that is not bile-less. If bile-less, as a result of the discovery, is taken as a distinctive property *meaning* of long-lived thing, then the person may reject *ipso dicto* the possibility of a long-lived thing that is not bile-less. Similarly, if a person has already discovered that all long-lived things are bile-less, but holds this “conclusion” only implicitly, then an *epagôgê* citing examples of long-lived things, each being bile-less, may help the person to grasp the conclusion *explicitly*. As the person already holds the conclusion implicitly, he or she may reject the possibility of a long-lived thing that is not bile-less. And if bile-less is taken as a distinctive property *meaning* of long-lived thing, the person may reject *ipso dicto* the possibility of a long-lived thing that is not bile-less.

But the point remains that for Aristotle, induction as the *discovery* of a general truth “all S is P” connected with the *natural kinds* S and P (where S has a potentially infinite number of members), one faces the problem of induction. One cannot reject *ipso dicto* the possibility that there is an S not yet encountered that is not P, since a thing being an S or a P is a matter of its *nature*, not of human convention or stipulation.²⁰

The second problem I have with McCaskey’s conception of Aristotelian *epagôgê* is the view that all Aristotelian *epagôgai* are intended to predicate a *distinctive property* (*idion kath’ auto*) of the subject kind.²¹ This conflicts with my reading of the genetic account, since on my reading, the *epagôgê* described can

²⁰ It appears that the same general point would apply to Socratic induction—if Socrates believed that general truths about members of natural kinds are *discovered* by induction. Socrates may not have believed that. Assuming Socrates held that kinds are natural, he might have believed that the function of induction is to *remind* a person of or *make explicit* to a person a definitional truth he or she already knows. If that is the case, then it seems that Vlastos is right about *Socratic* induction that there is no problem of induction involved.

²¹ For McCaskey, Aristotelian inductions in the secondary sense also predicate a distinctive property. Again, according to McCaskey, Aristotelian induction in the secondary sense is the “deduction from induction” (“*sullogismos ex epagôgês*”) discussed in *APr.* B.23 (McCaskey, 362–3). According to McCaskey, after Aristotle in that chapter tacitly performs an induction in the primary sense that all and only individual long-lived things (C) are bile-less (B), Aristotle is ready to perform his induction in the secondary sense, his “deduction from induction.” The deduction from induction involves the term A, which designates, not individual long-lived things like C, but the *property* long-lived. Accordingly, the “deduction from induction” is as follows. Each individual long-lived thing (C) is long-lived (A). All bile-less things (B) are individual long-lived things (C). (This premise is secured by the induction in the primary sense.) Thus, all bile-less things (B) are long-lived (A). What does a “deduction from induction” accomplish cognitively, given that we already know from induction in the primary sense that all bile-less things (B) are individual long-lived things (C)? According to McCaskey, a “deduction from induction,” i.e. induction in the secondary sense, has the function of dropping any reference to particulars, so that one has a relation only between two universals (in this case, the universal long-lived (A) holding of the whole of the universal bile-less (B)), (McCaskey, 361). But the crucial point here is that for McCaskey, Aristotelian induction in the secondary sense also consists in predicating a distinctive property.

yield a principle in which the predicate is not a distinctive property of members of the subject kind, such as “all horses are mammals.” (I am assuming here that Aristotle thinks that mammal is the *immediate* genus of horse.)

There are several pieces of evidence against this view. First, as McCaskey recognizes (McCaskey, 371), *Top. V*, which prescribes rules for finding the *idion kath’ auto* of things of a kind, does not anywhere use the term “*epagôgê*” (or any inflection of “*epagôgê*”). This, of course, does not mean that in *Top. V*, Aristotle is not prescribing rules for an epagogic process. But if, as McCaskey thinks, that *all* Aristotelian *epagôgê* consists in seeking to predicate a distinctive property, that seeking to predicate a distinctive property of a set of particulars *is* Aristotelian *epagôgê* (McCaskey, 370), then it seems that *epagôgê* (or, given that the *Topics* is on dialectic, dialectical *epagôgê*) is the *subject* of *Top. V*. If so, it seems that we should expect *Top. V* to explicitly mention *epagôgê*, even to state that *epagôgê* (or dialectical *epagôgê*) is the subject, as the *Analytics* at the beginning state that demonstration (i.e., *apodeixis*, a kind of *sullogismos*) is their subject (*APr.*, 24a10-3). But *Top. V* does not explicitly mention *epagôgê*.

Second, recall that *APo. A.4* lays down certain requirements that a predication in an ultimate premise of demonstration must meet. The predication must be “*katholou*,” which, according to the chapter, consists of the predication holding “of every case” (“*kata pantos*”) of the subject (*APo.*, 73a27-b33) and its holding “in itself” (“*kath’ auto*”) of the subject. According to the chapter, a

predication holds “in itself” if (a) the predicated term is in the account of the “what it is” (i.e., the definition) of the subject (*APo.*, 73a35-7) *or* if (b) the subject term is in the account of the what it is (the definition) of the predicate (*APo.*, 73a37-b5). Given these requirements, and assuming mammal is the immediate genus of horse, the proposition that all horses are mammals would satisfy the requirements. As such, the proposition would be a principle, an ultimate premise of demonstration. And as I have argued (especially in response to Hamlyn in Ch.2), according to the genetic account, *epagôgê* based on sense perception is how we come to know principles. Hence, according to the genetic account we would come to know a principle such as the putative principle that all horses are mammals—one whose predicate is *not* a distinctive property of members of the subject kind—by *epagôgê*.

Third, recall my argument in Ch. 2 against Hamlyn that for Aristotle, any conviction (as distinguished from an unreasoned belief) is obtained by either *epagôgê* or *sullogismos*. I had argued that it is plausible only that for Aristotle the common conviction that all horses have four legs—a conviction that many children living during Aristotle’s time would have had—would be reached by *epagôgê*—by observing particular horses and generalizing. Yet having four legs, (i.e. being a quadruped) is very clearly not a distinctive property of horses.

Finally, recall the description of a dialectical *epagôgê* in the *Topics* as one of the two kinds of dialectical *logos*:

...we need to distinguish how many kinds of dialectical argument [*logôn*] there are. One kind is *induction* [*epagôgê*], another is *deduction* [*sullogismos*]. Now, what a deduction is was explained earlier. Induction, however, is proceeding from particulars up to a universal. (*Top.* I, 105a10-4, italics in original)

This passage appears to be definitional with regard to *epagôgê* since its description of an *epagôgê* is said to follow an explanation of *what sullogismos* is. Yet the passage does not indicate that in an *epagôgê* one must seek to predicate a property, of the particulars, that is *distinctive* to them.²²

A process of reasoning that consists of predicating a distinctive property of certain particulars evidently *would* for Aristotle be an *epagôgê*. For such a process would be one of reasoning from the particular to the universal. And I have argued in Ch. 1 that Aristotle holds the Direction Thesis with regard to *epagôgê*, i.e. that he considers *epagôgê* to be reasoning from the particular to the universal. But Aristotle evidently does not, as McCaskey thinks, consider *all epagôgê* to seek to predicate of particulars of a kind a property that is distinctive to those particulars.

²² In Ch. 1, I provide this along with other passages that Aristotle holds the Direction Thesis with regard to *epagôgê*—that he thinks that *epagôgê* consists of reasoning from the particular to the universal. It is significant that in none of those descriptions of *epagôgê* does Aristotle mention that for the *epagôgê* to be legitimate, the property predicated of the particulars must be distinctive to those particulars. For if according to Aristotle, *all epagôgê* seeks to make such a predication, we should expect him to mention it in descriptions of *epagôgê*.

IV. Conclusion

William Whewell's conception of Aristotelian induction is not based on a reading of the genetic account of *APo.* B.19, but conflicts with my view of what occurs in that account. According to Whewell's conception, an inductive truth for Aristotle is an *observed* or *perceived* truth and not a reasoned one. Whewell thinks this is the case mainly because he thinks Aristotle was aware of the problem of induction and did not think it could be solved, i.e. did not think that an inductive truth is *rationally* justified. This conflicts with my position that Aristotle in the genetic account is aware of the problem of induction and attempts to solve it. However, Whewell's conception of Aristotelian induction evidently is not correct, as indicated especially by that fact that Aristotle evidently considered *epagôgê* and *sullogismos* as the two main species of *logos*.

McCaskey's conception of Aristotelian induction is also not based on a reading of the genetic account of *APo.* B.19. But, like Whewell's conception, McCaskey's conflicts with my view of what occurs in that account. According to McCaskey's conception, all *epagôgê* for Aristotle consists of predicating a distinctive property of the subject. This conflicts with my reading of the genetic account, according to which propositional principles that do not predicate a distinctive property of the subject can be reached. Further, according to McCaskey's conception, for all Aristotelian *epagôgê* that is not deduction (i.e., a "deduction from induction" as described in *APo.* B.23), there is no problem of

induction. For the induction seeks to make clear the meaning of a universal term, which is subject of the conclusion of the induction. The predicate of the conclusion is the distinctive property meaning of the subject term. Any alleged instance of the subject term that does not share the predicated property would be rejected *ipso dicto*, by the distinct-property meaning of the subject term, as a genuine instance of the subject term. This conflicts with my view that Aristotle in the genetic account does face the problem of induction.

The evidence, however indicates that, while Aristotle would consider the process of seeking to predicate of all particulars of a kind a distinct property to be an *epagôgê*, he does not consider *all epagôgê* to be such a process. Further, if inductive *discovery* of general truths reflecting natural kinds is involved in the genetic account (as it evidently is), and at least some of these kinds have a potentially infinite number of members and given Aristotle's view that a mind cannot traverse an infinite series, then, by the nature of such inductive discovery, the problem of induction is involved with it.

Chapter 7: Conclusion: Aristotle's Attempted Solution

I. Introduction

Having provided and defended my reading of the genetic account of *APo*. B.19, my main concern in this chapter is to explicitly identify the implications of that reading with regard to the question of whether, in the genetic account, Aristotle is aware of the problem of induction and what (if anything) is his attempted solution to it.

In Section II, I will provide a summary of the results of the previous chapters of this work. In Section III, I will seek to answer explicitly the questions, based on my reading of the genetic account, of whether Aristotle in the account is aware of the problem of induction and what his attempted solution is. In Section IV, I will consider and respond to certain objections. Finally, in Section V, I will present my conclusion.

II. Summary of Results

In Ch. 1, I defined a certain sense of “induction.” The sense is that of (i) reasoning from propositions (the premises) that are more particular to a proposition (the conclusion) that is more universal, (ii) in cases where the premises all predicate a certain property of particular instances or species of the subject of the conclusion and the conclusion predicates the same property of its

subject, and (iii) where one does not have such premises in regard to *all* of the particular instances or species in case the conclusion is universally quantified, or one has premises for *less than most* of the particular instances or species in case the conclusion is quantified with “most.” The term “perfect induction” is often used to refer to an enumerative induction in which the inducer knowingly enumerates *all* instances or species subsumed by the subject of the conclusion. Since in the sense of “induction” I have defined, the inducer does not enumerate *all* the instances or species (and in the case that the conclusion is quantified with “most,” the inducer enumerates less than most of the instances or species), I refer to “induction” in the sense I have defined as “imperfect inductive generalization.” As I indicated the “problem of induction” that I am concerned with in connection with the genetic account of *APo. B.19* is the problem of how one can justify the inference to the conclusion in an imperfect inductive generalization, given that it is *imperfect*.

Moreover, in Ch. 1, I provided evidence that at least some *epagôgê* for Aristotle is imperfect inductive generalization. I showed that part of the evidence is that Aristotle held the Direction Thesis in regard to *epagôgê*, which is that *epagôgê* (unlike *sullogismos*) is reasoning from the more particular to the more universal. Further, part of the evidence is that Aristotle held the Necessity Thesis in regard to *epagôgê*, which is that in an *epagôgê* (in contrast to *sullogismos*), it is not essential for the conclusion to follow *of necessity* from the premises.

In Ch. 2, I argued against Hamlyn's reading of the genetic account. As part of my argument against Hamlyn, I provided evidence that the genetic account is not about the acquisition of concepts alone nor about the acquisition of propositional truths alone. Rather, it is about coming to know principles (*archai*) of demonstration, which include concepts, and certain definitional propositional truths connected with the concepts acquired. Part of my argument against Hamlyn consisted in arguing against his claim that the genetic account is not concerned with the justification of principles; I provided evidence that it is. Another part of my argument consisted in arguing against his claim that according to the genetic account, the sense perception of one particular is sufficient to grasp a universal instantiating it. The conclusion of my argument against Hamlyn was that, contrary to Hamlyn, the genetic account *is* evidently a description of the *epagôgê* mentioned at the end of the account. I was hence able to provide strong evidence that, for the two questions Aristotle asks near the beginning of *APo.* B.19 (i.e. the questions of how we come to know the principles and what the knowing state is), Aristotle's answers are: *epagôgê* based on sense perception and *nous*, respectively.

In Ch. 3, I argued against Evans' and Harari's readings of the genetic account, insofar as their readings conflict with mine. As I did against Hamlyn, I argued against both Evans and Harari that according to the genetic account, the sense perception of just one particular is enough to grasp a universal (i.e., a

universal truth in the case of Evans, a universal concept in the case of Harari). Evans provided some evidence from outside the genetic account that for Aristotle, the sense perception of just one particular fact is sufficient to grasp and secure (through *nous* as intuition) a universal truth. But I have shown that for Aristotle, such legitimate induction from a single instance is evidently the exception rather than the rule. As I had indicated that according to the genetic account *many* particulars of a kind evidently must be retained in memory to form an experience (*empeiria*), and that a universal and a propositional principle is grasped from the experience, we can allow that Aristotle thinks there are *exceptional* cases where one can securely induce a universal truth from the sense perception of one particular fact. With regard to Harari, I argued against her reading of the genetic account as solely about the acquisition of principles that are concepts (not propositions), defending my view that the account is about the acquisition of both concepts and certain propositional truths connected with the concepts.

With regard to both Evans and Harari, I argued against the claim that *nous* in the genetic account is intuition that allows one to veridically grasp principles. Part of my argument against both consisted in seeking to resolve a contradictory triad that seems to appear in Aristotle's works:

(g) *Epagôgê* is the means of coming to know principles (as indicated by *APo.* B.19).

(h) *Epagôgê* is a kind of *logos* (as indicated by various texts).

(i) *Nous*, not *logos*, is the means of coming to know principles (as indicated by the passage from *EN*, 1143a35-b4).

I had argued that there is strong evidence that Aristotle holds (a) and (b), but that we can reasonably deny that he held (c) if we take “*logos*” in (c) to mean reasoning. (I argued that for the textual evidence that seems to indicate that he held (c), we can and should translate “*logos*” as “account” or “explanatory account.”) Hence, I defended my view that for the two questions that Aristotle asks near the beginning of *APo.* B.19 (i.e. how we come to know the principles and what the knowing state is), *nous* is not part of his answer to the *first* question, but is the answer to the second. Aristotle’s answer to the first, again, is evidently *epagôgê* based on sense perception.

Having cleared away Hamlyn’s, Evans’ and Harari’s readings of the genetic account of *APo.* B.19, in Ch. 4, I provided my own reading, with some initial evidence. According to my own reading, (a) the genetic account does not claim that the sense perception of a single particular is enough to grasp the universal it instantiates. Rather, (b) according to the account, *many* percepts, i.e. *many* particulars, of a kind are retained in memory, and their association with one another on the basis of similarity forms an experience (*empeiria*). (c) These

experiences are the “undifferentiated items” that the account mentions; they are undifferentiated from other forms in one’s mind, and their *becoming* differentiated consists in the universal form shared by all the particulars comprising the experience becoming distinct and thereby salient. This is the grasp of the universal (such as man), and this allows one to grasp certain definitional truths connected with the universal (such as “all (or most) humans reason”). (d) This gives a picture of the genetic account as a description of the *epagôgê* mentioned at the end of the account, which is how one comes to know, i.e. reaches and secures, the principles of demonstration. And (e) *nous*, discussed after the genetic account, is best viewed as the state of knowing the principles (i.e. as the answer to the *second* question near the beginning of *APO.* B.19), not as *intuition* that allows one to grasp the universal (i.e. as part of the answer to the *first* question near the beginning of the chapter).

In Ch. 5, I defended four crucial theses on my reading of the genetic account. I had already defended my claim that (a) the genetic account does not claim that the sense perception of a single particular is enough to grasp the universal it instantiates. In Ch. 5, I defend my claim that (b) according to the account, *many* percepts, i.e. *many* particulars, of a kind are retained in memory, and their association with one another on the basis of similarity forms an experience (*empeiria*). The object of an experience, contrary to Bayer, is evidently not a single particular. Further, contrary to Bolton, the best reading is

evidently not that an “undifferentiated item” (and an “experience”) is a mental compound to be analyzed into parts, but that it is an experience consisting of many particulars of the same kind retained in memory. (c) Such an experience becoming *differentiated* from other forms in one’s mind is the universal form shared by all the particulars comprising the experience becoming distinct (and thereby salient) from other forms in one’s mind. This is the grasp of the universal.

Further, contrary to Engberg-Pedersen, the role of *epagôgê* in the genetic account is evidently not merely to generalize from cases, but (d) to allow one to reach and justify the principles of demonstration. Moreover, I had earlier argued that (e) *nous* in the genetic account should not be taken as intuition that allows one to grasp the universal and thereby solves (or allows one to avoid) the problem of induction. In Ch. 5, I defend this claim further against Bayer, Ross, Irwin, and Kal.

In Ch. 6, I argue against two conceptions of Aristotelian induction that conflict with my reading of the genetic account of *APo.* B.19 but which are not based on readings of the genetic account. I argue against Whewell that inductive truths for Aristotle are not merely perceived or observed truths, but reasoned truths, induction (*epagôgê*) being one of the two main species of reasoning (*logos*). And, I argue against two of McCaskey’s positions. I argue against his position that *all* inductions (*epagôgai*) for Aristotle involve predicating a distinctive property of a subject kind, indicating that the evidence does not

support this claim. And, I argue against McCaskey's position that induction for Aristotle that is not a kind of deduction does not involve any problem of induction. I argue that any *epagôgê* in the *discovery* of a general truth about members of a natural kind that are potentially infinite in number by nature involves the problem of induction. Since the process of *epagôgê* described in the genetic account is, in part, for discovering general truths about members of natural kinds, and since at least some natural kinds for Aristotle have a potentially infinite number of members, at least some of the *epagôgai* for reaching principles in the way described by the genetic account involve the problem of induction.

III. The Problem of Induction and the Attempted Solution

Recall the two questions I asked in the Introduction to this work: (1) In the genetic account of *APo.* B.19, is Aristotle aware of the problem of induction? (2) What, if anything, is his attempted solution to the problem? We can now turn to consider how my reading of the genetic account provides an answer to each of these two questions.

Let us consider examples of inductions as described by the genetic account on my reading. Consider two contiguous passages (that I discussed in Ch. 4) in the genetic account that describe the process, T and U:

[T]

Given that perception is present in them, in some animals the percepts are retained and in others they are not. If they are not, then the animal has no knowledge [*gnôsis*] when it is not perceiving (either in general or with regard to items which are not retained). But some can still hold percepts in their soul after perceiving them. When this occurs often, there is then a further difference: some animals come to have an account [*logon*] based on the retention of these items, others do not. (*APo.*, 99b36-100a3)

[U]

[a] Thus from perception there comes memory [*mnêmê*], as we call it, and from memory (when it occurs often in connection with the same item) experience [*empeiria*]; for [b] memories which are many in number form a single experience. [c] And from experience, or from all the universal [*tou katholou*] which has come to rest in the soul (the one apart from the many, i.e. whatever is one and the same in all these items), there comes a principle [*archê*] of skill [*technês*] or understanding [*epistêmês*]—[d] of skill if it deals with how things come about, of understanding if it deals with how things are. (*APo.*, 100a3-9)

Again, we begin with sense perceptions of particulars. Percepts, particular forms that are perceived, are retained in memory. The percepts are of many particulars of a kind, and as a result of their similarity, are associated with one another to form an experience (*empeiria*).

One example of the process described would be a child perceiving, and retaining percepts of, humans. A child would perceive Socrates, and in particular, many attributes about him: he moves on two legs, he reasons,¹ etc. The child

¹ The child would not directly perceive Callias reasoning, but it is reasonable to think that for Aristotle the child would perceive signs of Callias, etc., reasoning, especially considering that reasoning and speech in Greek are referred to by the same word (“*logos*”), suggesting that the

would retain the perceived particular form of Socrates as a percept. A similar process would occur with regard to Callias. The child would perceive that Callias is tall, that he moves on two legs, that he reasons, etc. And the child retains the perceived particular form of Callias as a percept. The child similarly perceives and retains percepts of many other humans. Because of the similarity of the percepts, they are associated with one another in the child's mind, forming a single experience (*empeiria*).

Note first that the cognitive content provided by the percepts in the child's mind is not only of particular *things* but also of particular *facts*. Again, the particular forms retained comprise particular facts, such as the facts that Socrates moves on two legs, Socrates reasons, that Callias is pale, that Callias is tall, and that Callias reasons, etc. Hence, the propositions that would express the facts are *implicit* in the child's mind (and depending on the child's age, education, etc., some or all of the propositions may be *explicitly* grasped).² As we will see later,

Greeks believed that there was a very close connection between the two. And, arguably, a child can perceive Callias et al speaking.

² Since the genetic account of *APo.* B. 19 is clearly in part about the acquisition of concepts, it evidently is intended to describe a process that is common to humans, not just to scientists (i.e., to those seeking *epistêmê*). This is further suggested by the statement in the account that "...the soul is such as to be capable of undergoing this" (*APo.*, 100a13-4). Aristotle seems to think that ordinary processes of concept acquisition and ampliative induction provide much of the foundation for *epistêmê*. It may, however, be the case that for some cases, a deliberate process of concept acquisition and induction is needed. Such may be the case, for example, for a potential cosmologist to form the concept planet and reach the putative principle that all the planets are near (in relation to the stars).

some of these propositions will serve as *premises* for an “induction” in the sense I have defined.

Passage T says that “some animals [presumably humans] come to have an account [*logon*] based on the retention of these items [i.e. percepts]...” On my reading, again, the account is a propositional principle of demonstration. Further, recall that on my reading, Passage U fills in some of the steps from the retention of the percepts to the grasping of an account. Statement Ua-b says that memories which are many in number and in connection with a single item (on my reading, retained percepts of many particulars of a single kind) form a single experience (*empeiria*). So far, in the child’s mind, we have percepts of many particular humans forming a single experience. Next, Passage U (statement Uc) says: “And from experience, or from all the universal [*tou katholou*] which has come to rest in the soul (the one apart from the many, i.e. whatever is one and the same in all these items), there comes a principle [*archê*] of skill [*technês*] or understanding [*epistêmês*].” On my reading, this indicates that a universal is grasped from an experience, and from the universal, a propositional principle (“*archê*”), the “account” (“*logon*”) mentioned by Passage T, is grasped. The universal, according to statement Uc is “the one apart from the many, i.e. whatever is one and the same in all these items [i.e., the particular percepts].” This “one apart from the many,” or “whatever is one and the same” in all the particular percepts comprising the experience is, on my reading, the universal form shared by all of

the percepts. So, from the experience comprised of percepts of many particular humans, the child will grasp the universal form common to all humans, the form of man. But how exactly is this done? This is indicated by Passage C:

[C]

[a] When one of the undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul; [b] for although [c] the particular is perceived, [d] the perception is of the universal,—[e] e.g. of man, not of Callias the man. (*APo.*, 100a15-b1, trans. Barnes modified³)

Again, the “undifferentiated items” (*adiaphora*), on my reading are experiences that are *undifferentiated* from other forms in the child’s mind. The experience comprising percepts of many humans is, at this stage, undifferentiated. Although the percepts are associated with one another as a result of similarity, there still is not a clear difference between the all of the percepts of the experience, and percepts of other things (likely, other animals). At a certain point, the child recognizes that the particular forms of humans are all different from other forms, not only in shape, but also in the fact that speech or reasoning (*logos*) is part of what all the humans of whom percepts are retained have in common. At this point the child has grasped the universal form of all humans, the form man, a primitive universal, i.e. *infimae* species. As statement Ca says, “[w]hen one of the

³ “[T]he particular is perceived” replaces Barnes’ “you perceive particulars,” and “the perception is of the universal” replaces Barnes’ “perception is of universals.” This is done to make the translation more closely reflect the Greek.

undifferentiated items [*adiaphorôn*] makes a stand, there is a primitive universal in the soul...”

Aristotle is aware that there is an epistemic gap between particulars and universals. But particular forms instantiate universal forms, and in this sense, a particular perceived form *represents* the universal species of the particular, so that the universal is, not the object, but in a sense the *subject* of sense perception. As such many perceived particular forms of instances of a given kind provide one with the data needed to grasp the universal form. As clause Cb-e tries to explain, “...for although the particular is perceived, the perception is of the universal,--e.g. of man, not of Callias the man.”

Such is how, on my reading of the genetic account, the child is able to grasp the universal man from retained perceptions of Callias, Socrates, etc.

But how does the child, from this, grasp a propositional principle connected to man? Passage U says that the principle—on my reading a propositional principle—comes from the grasp of the universal. Recall that the cognitive content provided to the child by the percepts of particular humans includes facts—such as the fact that Socrates reasons, Callias reasons, etc. When the child has retained such percepts as part of an experience, but has not yet grasped the universal man, such facts may be able to serve as implicit premises

for the implicit conclusion that all (or most) humans reason.⁴ This would be an imperfect inductive generalization, and “induction” in the sense that I had defined in Ch. 1. For since according to Aristotle the species man has a potentially infinite number of specimens and the mind cannot survey infinitely many things, the child could not possibly ever survey and retain percepts of *all* (or even *most* of) the specimens.

However, if the child draws the inductive conclusion at this point, i.e., before grasping the universal form of man, the conclusion would not be secure. What if there are many, perhaps a majority of, humans, whom the child has not perceived and whom do not reason? The problem of induction, with regard to the induction that all (or most) humans reason, is, at this stage, unsolvable.⁵

Passage U, again, indicates that it is from the grasp of the universal that one grasps the (propositional) principle. And that is what is required for the child to *securely* induce the principle that all (or most) humans reason: the child must grasp the universal form man.

Once the experience subsuming percepts of many particular humans is differentiated from other forms in the child’s mind, the form shared by all the

⁴ Again, “all (or most)” in my expressions of putative Aristotelian principles is intended to leave open whether the principle is quantified with “all” or “most.” Aristotle thinks some principles are only “for the most part” rather than “always” and this may mean that the former are quantified with “most” rather than universally. See Ch. 1, fn. 8.

⁵ A more basic problem is that the child at the stage described would not have the *concept* of man, so the conclusion that all (or most) humans reason could only be drawn inarticulately and vaguely, if at all.

particulars of the experience, the distinct universal form, which includes reasoning, is grasped. At this point the inductive conclusion that all (or most) humans reason would be secure. For it is a conclusion that would reflect the distinctive universal *form* of man.⁶

Again, in this example of the process described by my reading of the genetic account, there is an “imperfect inductive generalization,” and “induction” in the sense I defined in Ch. 1.⁷ It is an imperfect inductive generalization in a case where the number of specimens of the subject kind of the conclusion—man—is potentially infinite. Given the evidence I presented in Ch. 1 that Aristotle does not think a mind can traverse an infinite series, the inducer accordingly cannot possibly perceive all, or even most, of them. Further, recall that Aristotle, evidently, holds the Necessity Thesis with regard to *epagôgê*, that in an *epagôgê* (unlike in a *sullogismos*), the conclusion does not necessarily follow *of necessity* from the premises. And in this case, the conclusion that “all (or most) humans reason” does not follow of necessity from the finite, very limited (relative to the entire species of man) set of premises that Socrates reasons, Callias reasons, etc.

⁶ As I argued in Ch. 3 in response to Evans, there may be *exceptional* cases where one can reach a universal generalization from the sense perception of just one instance, but these cases are the exception.

⁷ Again, the premises of the induction, and perhaps even the conclusion, might be only implicit in the mind of a child, and even for an adult, the premises in an induction described by my reading of the genetic account might be only implicit. But this does not preclude it from being an “induction” in the sense I had defined in Ch. 1.

The first question posed in the Introduction to this work, again, was: is Aristotle in the genetic account aware of the problem of induction? The considerations above provide strong evidence that Aristotle is in the genetic account aware of the problem of induction.

This evidence is bolstered by my reading of Passage C. On my reading of the genetic account, the inductive conclusion is *secured* when the universal form is grasped, since the conclusion reflects the universal form. And my reading of clause Cb-e as an explanation of how we can grasp the universal from sense perceptions of particulars indicates that Aristotle is aware that there is an epistemic gap between the sense perception of particulars and the grasp of the universal. Since, as I have indicated, part of the cognitive content provided by the particular percepts retained is propositional, and grasped with the universal (such as man) is correlative definitional proposition (such as “all (or most) humans reason”), that clause suggests that he was also aware of the gap between the grasp of particular facts (such as the facts that Socrates reasons, Callias reasons, etc.) and a general fact (such as the fact that all (or most) humans reason, a fact that subsumes those particular facts).

Consider again that in the example above, the inductive generalization that all (or most) humans reason is *secured* by the child’s grasping the universal form of man, of grasping that reasoning is part of that distinctive universal form. This provides an answer to the second question asked in the Introduction to this work:

does Aristotle in the genetic account have an attempted solution to the problem of induction? The answer is the he evidently does.^{8,9}

Consider another example of the process. If we assume that for Aristotle four-legged is part of the definition (part of the differentia) of horse, there is a similar process in the child securing the principle that all (or most) horses have four legs. The child would perceive particular horses, and the perceived particular forms (percepts) of many horses would be retained in the child's memory. Since the particular forms are similar, they would be associated with one another in the child's mind, forming an experience (*empeiria*). Part of the cognitive content provided by each retained percepts is facts, such as: this thing has four legs; this other thing has four legs; etc. These facts, as we will see, are implicit premises behind the inductive conclusion to be reached. The experience is at first undifferentiated in the mind of the child from other forms (likely, those of other animals). But at a certain point, the experience becomes differentiated from other forms in the child's mind, so that the distinctive form common to all the

⁸ Of course, Aristotle's attempted solution in the genetic account, as I read it, to the problem of induction, is not one of simple enumeration. It is not a matter of enumerating a certain number of instances, as it depends on grasping the form of the subject kind of the conclusion, and that is not tied to perceiving any particular *number* of instances. This, however, does not alter the fact that it is an attempted solution to the problem of induction.

⁹ The claim that Aristotle, in the genetic account, thinks there is a solution to the problem of induction does conflict with the fact that he holds the Necessity Thesis with regard to *epagôgê* and *sullogismos*, as I argue in Ch. 1. For if an *epagôgê* that is an imperfect inductive generalization—such the one used to reach the principle that all (or most) humans reason—is viewed as *securing* its conclusion, what secures the conclusion is the grasp of the form of its subject kind—not the fact that the conclusion follows *of necessity* from the premises. In such an *epagôgê*, the conclusion does not follow of necessity from the premises.

particulars comprising the experience, is grasped by the child. This is the grasp of the universal horse. At this point, the child can securely grasp the conclusion that all (or most) horses have four legs, for this conclusion reflects the *form* of horse that the child has grasped. Again, this is an example of an imperfect inductive generalization. As with the first example above, for Aristotle, the number of specimens of the subject kind of the conclusion would be potentially infinite. And again, he thinks that a mind cannot survey infinitely many things. And in this *epagôgê*, as with the first, the conclusion does not follow of necessity from the premises. This indicates, again, that Aristotle in the genetic account is aware of the problem of induction. The child, by grasping the form of horse, can securely reach an inductive conclusion that reflects it, i.e. that all (or most) horses have four legs.

Let us consider another kind of example. After having grasped several species of animal, such as man, horse, dog, bird, etc., a person can grasp the universal animal, and a connected propositional principle, such as all (or most) animals have sense perception. For statement Bc (which is a part of Passage B, discussed in Ch. 2, 4, and 5), which comes right after Passage C, indicates, on my reading, such a process:

[Bc]

[c] Next, a stand is made among these items, until something partless and universal makes a stand. E.g. such-and-such an animal makes a stand, until animal does; and with animal a stand is made in the same way. (*APo.*, 100b1-3)

“These items” evidently refers to items like man, horse, bird, etc. When a person grasps each of those universal forms, he grasps of each that sense perception is part of the universal form. When the person has grasped several such universal forms, at a certain point they become distinct from certain other universal forms (presumably, forms such as bush, tree, etc.). What is distinct about them is that they have sense perception.¹⁰ At this point, the person can securely grasp the inductive conclusion that all (or most) animals have sense perception.¹¹

With this regard to this induction, it is unclear that it necessarily would be an *imperfect* inductive generalization. It may be the case that Aristotle thinks there are finitely many species of animals, and that we can enumerate *all* of the species, while knowing that we are. But even if this induction from species for Aristotle could be a perfect induction, it would not change the fact, as the first two

¹⁰ The percepts retained in memory to reach the truths about *infimae* species (i.e., all (or most) humans perceive; all (or most) dogs perceive; etc.) would, strictly speaking, not be individual animals perceiving but individual animals’ overt signs of perceiving, such as a bird, for example, repeatedly landing without crashing into the ground. This, however, does not appear to make any significant difference to the process as I have described it.

¹¹ The qualification “or most” here has to be understood as qualifying animals, not *kinds* of animals. For, as I discuss in Ch. 2 on Hamlyn, Aristotle near the beginning of the genetic account and in *On the Soul* indicates that animals have sense perception. It is unlikely that Aristotle thinks there are entire species of animals without any sense perception.

examples indicate, that there are inductions described by the genetic account as I read it that would be *imperfect* inductive generalizations.¹²

Aristotle evidently has an attempted solution in the genetic account of *A Po.* B.19 to the problem of induction. It is an attempted solution that depends on his doctrine of natural kinds, of real universals (i.e., those with an extra-mental existence) that are immanent in material particulars. In an imperfect inductive generalization used in reaching a definitional propositional principle connected with a universal, it is the grasp of the universal form that *secures* the propositional principle. The resulting picture is that, because Aristotle is making use of his doctrine of universal forms, which (if granted) seems to provide a simple solution to the problem of induction, Aristotle is aware, in the genetic account, of the problem of induction, but unlike Sextus Empiricus or David Hume, does not think it is a *big* problem.^{13, 14}

¹² It should be noted that the definitional truths connected with a given universal that I describe being reached through imperfect inductive generalization are all presented as predicating, of the members of the universal, the differentia or part of the differentia of the universal. To reach a definitional truth connected with a given universal that predicates, of the universal, the genus of the universal, one would first have to grasp the universal that is the genus. Thus, assuming mammal is the genus of man, one is likely to grasp the universal man first, in part because the genus mammal is wider than man. One would need to grasp the universal mammal as well before one can securely induce the definitional principle that all humans are mammals.

¹³ This, perhaps, is part of the reason that Aristotle does not discuss the problem very explicitly or in much detail.

¹⁴ Recall that part of the reason that Evans, Bayer, and Kal take *nous* in the genetic account to be intuition that grasps the universal kind and/or proposition is that they held, each in his own way, that *epagôgê* is too epistemically frail to secure principles that make up the foundation of *epistêmê*. I had stated earlier in connection with these commentators that the soundness of such a reason depends on a reading of the genetic account according to which the *epagôgê* is frail, and

IV. Objections

I will consider and respond to five objections to my view of what Aristotle's attempted solution in the genetic account to the problem of induction is.

The first objection is that the putative solution does not specify *when* an inductive generalization is justified, i.e. after *how many* perceived cases one can legitimately generalize.

This objection assumes that Aristotle's putative solution is a matter of simple enumeration. But as my reading of the genetic account indicates, the putative solution is not a matter of simple enumeration, but of the natural universal form becoming differentiated in the soul of the inducer.

At this point, one might modify the objection and object that the putative solution leaves unanswered the question of at what point, in principle, the universal form becomes differentiated in the mind. The answer being sought can be expressed in the form: the universal form shared by all of the particulars comprising an experience (*empeiria*) becomes differentiated from other forms in the inducer's mind when X is satisfied, where X is a condition explanatory of

that we can read the account in a way according to which the *epagôgê* is not viewed as frail. In Ch. 5, with regard to Bayer and Kal, I stated that it is implicit in my reading of the genetic account that the *epagôgê* is not so frail. We can now state more confidently that we can and should read the genetic account in such a way that, according to it, the *epagôgê* used to reach and justify principles is not frail. Thus, it seems that the claim, in support of taking *nous* as intuition that grasps the universal kind and/or proposition, made by Evans, Bayer, and Kal, that the *epagôgê* mentioned in the genetic account is too frail to secure principles of demonstration, has been more fully undercut.

(and thus, not identical to) the case that universal form is differentiated. It is true that the attempted solution to the problem of induction is not, and does not provide, an answer to that question. But it does not seem that Aristotle would think that having an answer to that question is essential to solving the problem. For again, as I have argued, the genetic account should be read as claiming that at a certain point, the form common to all of the particulars comprising an experience becomes differentiated from other forms in one's mind. But while we should read the genetic account as claiming this, it does not try to give any explanatory condition with regard to when that point is reached. The picture, rather, is that at some point one *does in fact* grasp the universal form. At that point, whatever that point is, one securely grasps the truth of certain generalizations pertaining to that form.¹⁵

A second objection is that the putative solution to the problem of induction is not a good one because it allows the possibility of making false generalizations. Imagine a person, for example, who has seen only white swans (and so has formed an experience of percepts of only white swans). When the form of swan is differentiated from other forms in the soul and thereby "makes a stand," the person might believe, in effect, that all swans are white, that whiteness is part of the form swan. Yet the generalization that all swans are white is false.

¹⁵ Further, Aristotle's statement in *APo.* B.19 at 100a14, after the epagogic process indicated by the genetic account had been described once, that "...the soul is such as to be capable of undergoing this" suggests that the above is Aristotle's view.

For my response to this objection, recall that principles which are ultimate premises of demonstration are to be essential predications, i.e. definitional truths.¹⁶ These are the principles to which the problem of induction in the genetic account of *APo.* B.19 is relevant.¹⁷ Accordingly, when a universal form of an undifferentiated experience becomes *differentiated*, the truth of propositional principles whose subject or predicate is part or all of the *differentia* of the universal grasped would also be grasped.¹⁸ Accordingly, for swans, it seems that a proposition that Aristotle would consider a true principle would be that all (most) swans have this (i.e. swan-like) shape. A person with the experience of swans would, presumably, have percepts of other white things in memory, including things that are very similar to swans (i.e. that are in fact birds other than swans). So while such a person might erroneously conclude that all swans are white, the conclusion is not a definitional proposition, and as such is not an ultimate premise

¹⁶ The main chapter indicating this is *APo.* A.4.

¹⁷ It does not seem that Aristotle would consider the acquisition of most other kinds of principles to be problematic at all. The knowledge that a thing exists would, it seems, be a matter of sense perception (if the thing is a particular), or concept acquisition (if the thing is a universal), and these cognitive actions are stages in the process described by the genetic account. Supposing a thing, such as a point or line in theoretical geometry, to exist would, it seems, be matter of simple stipulation. It is not clear whether Aristotle thinks that the genetic account also describes how we come to know “common axioms” such as the laws of non-contradiction and excluded middle, though it seems that the process described by the account would presuppose some kind of awareness of those laws. This leaves, it seems, only coming to know the truth of definitional propositional principles as subject, in the genetic account, to the problem of induction.

¹⁸ Apparently, one cannot grasp a definitional principle making use of the *genus* of a concept until one grasps the genus. So, for example, upon grasping man, one could not grasp that all men are animals (assuming that animal is the genus of man) until one has grasped animal.

of demonstration.¹⁹ Such inductions of definitional propositions (presupposing the existence and awareness of the relevant universal form) are more plausibly infallible.

In connection with this, we should note that much *APo.* B prior to B.19 discusses definitions. Ch. B.13, in particular, appears to prescribe a method of division for reaching a definition. It seems that, given my reading of the genetic account of B.19, part of the purpose of Ch. B.13 (and *Top.* VI, which prescribes dialectical methods for testing proposed definitions) is to distinguish definitional propositions from those which are not. This, presumably, would help one distinguish generalizations reached by *epagôgê* that are definitional from those that are not.^{20, 21}

A third objection is that on my reading of the genetic account, Aristotle's account of concept acquisition and attempted solution to the problem of induction both depend on the doctrine of natural kinds. And it seems to beg the question with regard to that doctrine. That doctrine, apparently, can be expressed in the form of the general proposition that all or most particulars by their *nature* belong

¹⁹ It is thus reasonable to think that Aristotle would consider a non-definitional proposition like "all/most swans are white" as subject to demonstration if it can be demonstrated.

²⁰ Again, the generalization that all swans are white would presumably be one that is *not* definitional.

²¹ Hence, on my reading of the genetic account of *APo.* B.19, the *epagôgê* described is intended to securely justify definitional principles, but is not necessarily intended allow one to distinguish definitional principles from other generalizations one has reached by *epagôgê*. To do this, it seems that the methods prescribed in *APo.* B.13 and the *Topics* would be needed.

to kinds. Aristotle's attempted solution, in the genetic account as I have read it, to the problem of induction depends on his doctrine of natural kinds. But it seems that induction is needed to justify that doctrine itself.

We, however, do not have to interpret Aristotle's attempted solution to the problem of induction in a way that makes the attempted solution question-begging. A more plausible (i.e., charitable) interpretation, in connection with my reading of the genetic account, is that Aristotle thinks that the same processes (sense perception, memory, etc.) that lead to the grasp of a universal form (such as man) are the processes that, after the first few times they are used, establish that universal forms (and thus natural kinds) *exist*. On this interpretation, one need not justify by induction, *and in advance of any induction about members of any particular natural kind*, the claim that all or most particulars naturally belong to kinds. Put differently, if natural kinds in fact exist (and Aristotle thinks they do) and we can in fact grasp their universal forms (and Aristotle thinks we can), then we do not need to know the *theory* of how *epagôgê* is justified in order to successfully employ *epagôgê* to come to know universals and certain connected definitional truths. As one uses *epagôgê* to grasp universals, one will grasp that natural kinds exist. Aristotle himself would, presumably, think that he learned of the existence of natural kinds in this way.²²

²² Aristotle was likely introduced by Plato to the idea that particulars instantiate real universals, but to *justify* the claim that real universals, immanent in material particulars, exist, it seems that we can plausibly take Aristotle to have undergone the process I describe above.

A fourth objection to this account of concept acquisition and the resulting attempted solution to the problem of induction is that the process described in the genetic account by which one allegedly grasps a universal form (i.e., establishes that a given universal form exists) depends on *similarities* between particular forms instantiating the universal, and their *differences* from particular forms not instantiating the universal. But Aristotle does not give and justify any clear, objective criteria for what counts as similarity among two or more particular forms sufficient for them to be subsumed by the same universal form. Nor does he give and justify any clear, objective criteria for what counts as difference between two particular forms sufficient for them to be subsumed by two different universal forms. Without such criteria, Aristotle has not justified the claim that, when an experience is differentiated from other things in the soul, the existence of a universal *natural* kind, rather than an *artificial* collection of particulars with a vague “family resemblance” to one another, has been established. As a result, his putative solution to the problem of induction cannot properly rely on his doctrine of natural kinds.

With regard to this objection, it seems that this is a problem that Aristotle himself did not see. As a former student of Plato of nearly twenty years, Aristotle shares a certain crucial doctrine with Plato: that universals have a real (i.e., an extra-mental) existence. While Aristotle questions and criticizes Plato’s view that real universals *transcend* (or exist substantively and separately from) material

particulars,²³ it seems that he never seriously questions or recognizes any fundamental problem with realism about universals.²⁴ So while, as I indicated above, we do not have to interpret Aristotle as begging the question with regard to his view of the existence of natural kinds as behind a solution to the problem of induction, it appears that he simply did not recognize the philosophical problems with the view that universal natural kinds, determined by the forms of material particulars, exist. Hence, I maintain that while this objection contains a good criticism of Aristotle, it is not a good criticism of my reading of Aristotle.

Finally, there is an objection that is related to the last. Recall that I indicated in Ch. 1 that according to Aristotle, the predication in some principles (*archai*) holds only “for the most part.” I stated that in order to accommodate the interpretation of this claim according to which “for the most part” principles are propositional principles which (among other things) are quantified with “most” rather than universally, I would consider inductions with conclusions quantified with “most.” (See Ch. 1, fn. 8.) Accordingly, I often begin my expressions of putative Aristotelian definitional principles with “all (or most)” or the equivalent.

With this in mind, one may object that if some propositional principles are quantified with “most,” some members of natural kinds must not fully share the

²³ See, for example, *APo.*, 85a33ff, *Met.*, 1029a24ff, and *EN*, 1096a13-1097a13.

²⁴ Apparently, certain Hellenistic philosophers were the first to explicitly reject the existence of real universals, whether Platonic or Aristotelian (as in the case of the Stoics), or otherwise maintain an explicit agnosticism about them (as in the case of Academic and Pyrrhonian Skeptics).

universal form of the kind. There may be a few injured individual animals, for example, without sense perception, or a few humans without any rationality, or a few horses without four legs. If so, there is no way to objectively decide whether such a “deviant” individual is really a deviant member of the kind from whose form it seems to have to a large extent but from which it deviates to some extent, or whether it is not a member of that kind. As a result, in determining what ultimate particulars should be grouped together in a kind, it seems that we are left with much subjective discretion. If so, Aristotle’s kinds can hardly be described as *natural* kinds. If that is the case, then he does not really have a doctrine of natural kinds to rely upon in his attempt, as I describe it, to solve the problem of induction.

The evidence in Aristotle’s works (some of which I cite in Ch. 4, Section II and Ch. 6, Section III) does indicate that he accepts the doctrine of natural kinds. But, as I indicated with regard to the last objection, it seems that he did not recognize any fundamental philosophical problems with his doctrine of natural kinds. Allowing a few members of a given natural kind to deviate to some extent from the universal form of the kind, while not giving any objective criteria for what counts as a member of a kind, is a reflection of the deeper problem with Aristotle’s doctrine of natural kinds. Without any objective criteria for what counts as similarity sufficient to place a particular in the same kind as another, or for what counts as difference sufficient to place a particular out of the kind as

another, we are left with much subjective discretion with regard to classifications of particulars. This is a problem with Aristotle's doctrine of natural kinds. But, again, I maintain that given that he *held* the doctrine of natural kinds determined by the forms of things, this objection contains a good criticism of Aristotle, but not a good criticism of my reading of Aristotle.

V. Conclusion

Aristotle, in the genetic account of *APo.* B.19 is evidently aware of the problem of induction. Further, in that account, he evidently has an attempted solution to it, based on his doctrine of natural kinds. It appears that the attempted solution, based on the grasp of a universal form, seemed simple to him. As a result, it seems that while he is aware, in the account, of the problem, unlike Sextus Empiricus or David Hume, for example, he does not consider it to be a *big* problem. And while there are problems with his attempted solution, since it rests on a doctrine of natural kinds that does not seem to be justifiable, I maintain that this is a problem with Aristotle rather than with my reading of Aristotle.

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Appendix: Abbreviations of Titles of Aristotle's Works

The following abbreviations of titles of Aristotle's works are used throughout this work.

<u>Work Title</u>	<u>Abbreviation</u>
<i>Categories</i>	<i>Cat.</i>
<i>Eudemian Ethics</i>	<i>EE</i>
<i>Generation of Animals</i>	<i>GA</i>
<i>Metaphysics</i>	<i>Met.</i>
<i>Nicomachean Ethics</i>	<i>EN</i>
<i>On the Heavens (De Caelo)</i>	<i>DC</i>
<i>On Interpretation (De Interpretatione)</i>	<i>DI</i>
<i>On the Soul (De Anima)</i>	<i>DA</i>
<i>Physics</i>	<i>Phys.</i>
<i>Posterior Analytics</i>	<i>APo.</i>
<i>Prior Analytics</i>	<i>APr.</i>
<i>Rhetoric</i>	<i>Rhet.</i>
<i>Topics</i>	<i>Top.</i>